

Department of Energy (DOE)
Office of Energy Efficiency and Renewable Energy (EERE)

**Fiscal Year (FY) 2017 Vehicles Technologies Program Wide
Funding Opportunity Announcement**

Funding Opportunity Announcement (FOA) Number: DE-FOA-0001629

FOA Type: Initial

CFDA Number: 81.086

FOA Issue Date:	12/15/2016
Amendment 000001	01/09/2017
Amendment 000002	02/22/2017
Amendment 000003	03/15/2017
Informational Webinar:	1/10/2017
Submission Deadline for Concept Papers:	1/31/2017 5:00pm ET
Anticipated Date for Concept Paper Recommendation Notifications	2/21/2017
Submission Deadline for Full Applications:	3/24/2017 5:00pm ET
Expected Date for EERE Selection Notifications:	June 2017
Expected Timeframe for Award Negotiations	August 2017

- Applicants must submit a Concept Paper by 5:00pm ET the due date listed above to be eligible to submit a Full Application.
- To apply to this FOA, applicants must register with and submit application materials through EERE Exchange at <https://eere-Exchange.energy.gov>, EERE's online application portal.
- Applicants must designate primary and backup points-of-contact in EERE Exchange with whom EERE will communicate to conduct award negotiations. If an application is selected for award negotiations, it is not a commitment to issue an award. It is imperative that the applicant/selectee be responsive during award negotiations and meet negotiation deadlines. Failure to do so may result in cancelation of further award negotiations and rescission of the Selection.

AMENDMENTS

All changes to the Funding Opportunity Announcement as a result of this amendment are highlighted throughout the body of the FOA as follows:

Amendment No.	Date	Description of Amendment
000001	01/09/2017	The purpose of this amendment is to clarify the eligibility requirements for Area of Interest 3, clarify acceptable vehicle types for AOI 3, and correct the submission date for questions."
000002	2/22/2017	The purpose of this amendment is to: 1) Revise AOI1 Special Deliverables; 2) Update the period of performance and the anticipated minimum and maximum award sizes for for AOI 2; and 3) Update the period of performance, minimum anticipated award size and anticipated number of selections for AOI 4.
000003	3/15/2017	The purpose of this amendment is to update the period of performance for Phase 1 of AOI 1.

NOTE: REGISTRATION/SUBMISSION REQUIREMENTS

Registration Requirements

There are several one-time actions you must complete in order to submit an application in response to this Announcement (e.g., obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number, register with the System for Award Management (SAM), and register with EERE eXCHANGE.gov). Applicants who are not registered with SAM and Grants.gov, should allow at least 44 days to complete these requirements. It is suggested that the process be started as soon as possible.

Applicants must register through the EERE eXCHANGE.

EERE eXCHANGE website: <http://eere.energy.gov/financing/exchange>

Applicants must obtain a DUNS number.

DUNS website: <http://fedgov.dnb.com/webform>

Applicants must register with the SAM.

SAM website: <http://www.sam.gov/> If you had an active registration in CCR, you should have an active registration in SAM. More information about SAM registration for applicants is found at: [https://www.sam.gov/sam/transcript/Quick Guide for Grants Registrations v1.7.pdf](https://www.sam.gov/sam/transcript/Quick%20Guide%20for%20Grants%20Registrations%20v1.7.pdf).

Applicants must register with Grants.gov.

Grants.gov website: <http://grants.gov/>

Applicants must register with Grants.gov in order to receive automatic updates, in the event that Amendments to this FOA are posted. However, please note that applications will not be accepted through Grants.gov.

Applicants must register with FedConnect.

FedConnect website: www.fedconnect.net.

In the event that an application is selected for negotiation of award, Applicants must be registered with FedConnect to receive the award. For more information regarding registration with FedConnect review the FedConnect Ready, Set, Go! Guide at [http://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect Ready Set Go.pdf](http://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect_Ready_Set_Go.pdf)

Submission Requirements

All application submissions are to be made via the EERE eXCHANGE at <http://eere.energy.gov/financing/exchange>. To gain access to the EERE eXCHANGE system, the applicant must first register and create an account on the main EERE eXCHANGE site. This account will then allow the user to submit an application for open EERE Funding Opportunity Announcements (FOAs) that are currently in eXCHANGE. It is recommended that each organization or business unit, whether acting as a team or a single entity, utilize one account as the appropriate contact information for each submission.

Applicants will receive an automated response when the Application is received; this will serve as a confirmation of EERE receipt. Please do not reply to the automated response. A “User Guide” for the EERE eXCHANGE can be found on the EERE website at <https://eere-Exchange.energy.gov/Manuals.aspx> after logging in to the system.

To receive notices via email regarding an FOA in eXCHANGE, such as amendments to the announcement or the posting of new questions and answers from eXCHANGE you must initiate an application submission to the FOA of interest. Please note that you must finalize your application before the specified due date and time to be considered for award.

Questions

Questions related to the use of the EERE eXCHANGE website or technical issues concerning the application submittal should be submitted to: EERE-ExchangeSupport@hq.doe.gov.

Questions related to the content of the Funding Opportunity Announcement must be submitted to DE-FOA-0001629@netl.doe.gov.

The deadline for submission of FOA related questions will be March 1915, 2017 at 8:00 PM Eastern time. Any questions submitted after that deadline will NOT be addressed. Questions regarding problems encountered with the application submittal will be answered as time permits. Applicants are encouraged to review the posted questions and answers daily. **Please note that you must first select this FOA Number in order to view the questions and answers specific to this FOA.** Please be as specific as possible when asking questions to insure that questions will be adequately addressed. All questions submitted must clearly identify the Area of Interest (AOI) to insure a timely and accurate response. Failure to identify the AOI, or not being as specific as possible with a question, may result in additional time to address the question or require further correspondence for further clarification regarding the submitted questions.

All questions and answers related to the content of this FOA will be posted at <https://eere-exchange.energy.gov/Default.aspx> DOE will try to respond to questions within 5 business days, unless a similar question and answer have already been posted on the website.

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EXECUTIVE SUMMARY

Means of Submission	Concept Papers, Full Applications, and Replies to Reviewer Comments must be submitted through EERE Exchange at https://eere-Exchange.energy.gov , EERE's online application portal. EERE will not review or consider applications submitted through other means. The Users' Guide for Applying to the Department of Energy EERE Funding Opportunity Announcements is found at https://eere-Exchange.energy.gov/Manuals.aspx .
Total Amount to be Awarded	\$19.7 million
Average Award Amount	EERE anticipates making awards that range from \$200,000 to \$7,500,000.
Types of Funding Agreements	Cooperative Agreements
Period of Performance	18 to 48 months
Performance of Work in the United States/Eligibility	As a condition of this announcement, all applicants must propose that 100% of the direct labor cost for the project (including contractor/sub recipient labor) will be incurred in the United States. See Section III. A.
Eligible Applicants	Individuals, Domestic Entities, Foreign Entities, Incorporated Consortia, Unincorporated Consortia, subject to the definitions in Section III.A.
Cost Share Requirements	Refer to the cost share table in Section III.B.
Submission of Multiple Applications	Applicants may submit more than one application to this FOA, provided that each application describes a unique, scientifically distinct project. All applications must be for a stand-alone project that is not dependent or contingent upon another application submitted to this or any other FOA.
Application Forms	Required forms and templates for Full Applications are available on EERE Exchange at https://eere-Exchange.energy.gov .
FOA Summary	<p>The Office of Energy Efficiency and Renewable Energy (EERE) is issuing, on behalf of the Vehicle Technologies Office (VTO), this Funding Opportunity Announcement (FOA) entitled "FY 2017 Vehicle Technologies Program Wide Funding Opportunity Announcement."</p> <p>This FOA supports a broad portfolio of advanced highway transportation technologies that reduce petroleum consumption and improve energy efficiency while meeting or exceeding performance and cost expectations.</p> <p>VTO seeks projects that accelerate the development of advanced batteries, lightweight materials, and emissions control systems, as well as the development and deployment of technologies and systems that enable significant improvements in the energy efficient mobility of people and goods.</p>

I. Funding Opportunity Description

A. Description/Background

The Office of Energy Efficiency and Renewable Energy (EERE) is issuing, on behalf of the Vehicle Technologies Office (VTO), this Funding Opportunity Announcement (FOA) entitled “FY 2017 Vehicle Technologies Program Wide Funding Opportunity Announcement.”

The U.S. transportation sector accounts for two-thirds of U.S. petroleum use and on-road vehicles consume nearly 85 percent of the petroleum used for transportation. U.S. dependence on oil for transportation affects the national economy and its potential for future growth—the U.S. sends more than ten billion dollars per month overseas for oil (this amount has been well over one billion dollars per day in recent years). The average U.S. household spends nearly one-fifth of its total family expenditures on transportation, making it the second-most expensive spending category after housing. Oil price volatility also affects the national economy and household budgets. Over the past ten years, U.S. regular conventional retail gasoline prices have fluctuated from around \$1.50 to over \$4 per gallon, causing fluctuations in annual household budgets by as much as \$1,200 per year for the average personal vehicle.

Public investment in advanced, energy efficient transportation technologies and systems will address these issues and improve our Nation’s energy security, support energy independence, reduce transportation emissions, and strengthen U.S. economic competitiveness.

VTO funds a broad technology portfolio and adheres to a comprehensive and analysis-based strategy of research, development, demonstration, and market barrier reduction activities. Advanced technologies for vehicle electrification, lightweighting, and advanced combustion engines will increase the efficiency of conventional vehicles and enable alternative fuel vehicles with sufficiently long ranges, sufficiently low costs, broad consumer appeal and significant market penetration potential.

This FOA supports the EERE 2016-2020 Strategic Plan and Implementation Framework Goal 1 to accelerate the development and adoption of sustainable transportation technologies. In addition, this FOA seeks highly-innovative, highly-leveraged, and scalable “smart mobility” projects that focus on transportation system-level opportunities to significantly increase the energy efficiency of goods and/or people movement.

This FOA contains a total of four (4) Areas of Interest (AOIs) and focuses on the research and development of advanced battery technologies, lightweight materials

technologies, advanced emissions control technology, and innovative technologies for energy efficient mobility.

The Statutory Authorities for this FOA are Public Law 102-486, Energy Policy Act (EPA) of 1992, as amended by Public Law 109-58, of EPA 2005; and the Energy Independence and Security Act (EISA, Public Law 110-140).

B. Topic Areas/Technical Areas of Interest (AOIs)

This FOA includes four (4) Areas of Interest which are reflected in the table below.

One or more projects awarded may be managed collaboratively with the US Army Tank Automotive Research Development and Engineering Center (TARDEC). A separate agreement with TARDEC will not be required.

AOI Number	Area of Interest
1	Battery500 Seedling Projects*
2	Integrated Computational Materials Engineering Predictive Tools for Low-Cost Carbon Fiber
3	Emission Control Strategies for Advanced Combustion Engines**
4	Energy Efficient Mobility Research and Development
Notes: *AOI 1 is subject to Phase II down select. See AOI discussion below for details. **AOI 3 Eligibility restricted to U.S. colleges, universities, and non-profit research institutions which operate as divisions under colleges or universities through determination of restricted eligibility, dated September 27, 2016. See AOI discussion below and the eligibility section of the FOA. Please refer to the eligibility section of the FOA for eligibility requirements for all other areas of interest within this FOA.	

Area of Interest (AOI 1): Battery500 Seedling Projects

Note: DOE/NNSA Federally Funded Research and Development Centers (FFRDCs) are eligible to apply for funding as a Prime Recipient or Subrecipient.

AOI 1 Objective

The purpose of this topic is to identify proof-of-concept or seedling projects that will complement the research in the Battery500 Program. The objective of the Battery500 Program is to research, develop, and demonstrate lithium battery technologies capable of achieving a cell specific energy of ≥ 500 Wh/kg while

achieving 1,000 cycles. The two technologies being developed in the program are Lithium metal/Sulfur and Lithium metal/high Nickel Lithium Nickel Manganese Cobalt (NMC) cells, using solid or concentrated liquid electrolytes. The work is organized into three thrusts:

1. Materials/Interfaces including mixed conductive coatings and controlled surface reactions
2. Electrode Architectures including thick, conductive cathode and 3-Dimensional (3D) Li composite structure
3. Cell Design/Integration including cell modeling, 1-Dimensional (1D) or 2-Dimensional (2D) Li ion conductor, and de-coupled the solid electrolyte interphase reactions

AOI 1 General Requirements

Sample, but not exhaustive, seedling topics include emerging concepts, alternative active materials – including multi-electron and conversion reaction materials, 3D printed architectures, layer-by-layer fabrication of solid electrolytes, etc.

Applications should focus on frontier or cutting edge ideas and demonstrate that the new idea is plausible and worthy of further research and development.

Applications must organize tasks and schedule into two Phases. Phase 1 should be 18 months with phase 2 being 18-30 months in duration. The total project should not exceed 48 months in duration. It is anticipated that the phase 2 downselect will occur by March 31, 2019.

- Phase 1 should include exploration and selection of materials concepts and characterization of the technology approach with bench testing of a cell to demonstrate Battery500 specific energy technology targets.
- Phase 2 should include design and development of the selected technology concept and improvement of cell performance required to achieve or exceed Battery500 specific energy technology targets. It is anticipated that 12 test cells will be delivered annually to DOE for testing in phase 2.

Competitive Down-Select: A competitive down-select process will take place at the end of Phase 1. Only entities that receive a Phase 1 award will be allowed to submit a Phase 2 application for consideration under the competitive down-selection process. For successful Phase 1 awardees intending to participate in the Phase 2 process, a Renewal Application will be required to be submitted. Renewal Applications are requests for additional funding for a period subsequent to that provided by a current award. DOE will evaluate the Renewal Applications against established criteria as part of a competitive process. Detailed information on the Renewal Application requirements, submission procedure, and evaluation criteria will be provided in the cooperative agreement for the Phase 1 awards. Potential

Phase 2 downselect criteria are listed in Section IV., Application Review Information.

Upon completion of the competitive project review (down-selection process), EERE will select projects to receive Federal funding beyond Phase I (Budget Period 1). Due to the availability of funding and program considerations, only a portion of the recipients may be selected to receive funding for project continuation. As a result of this down-select process, certain projects will not receive Federal funding beyond Phase I (Budget Period 1), even if the project is meeting the pre-defined metrics.

For Phase 1 awardees not interested in applying for Phase 2 or not selected by DOE for a Phase 2 award, all Phase 1 and final deliverables will be due at the end of Phase 1 in accordance with the instructions in the award's Reporting Requirements Checklist and Statement of Project Objectives.

AOI 1 Specific Requirements

In addition to the information provided in the narrative above specific to this AOI, applications must:

- Identify the cell chemistry – anode and cathode materials (electrochemical couple), electrolyte composition, and cell composition/construction – that will be used to demonstrate success in the research project. The cell chemistry must clearly show the potential to satisfy the Battery500 specific energy technology targets.
- Demonstrate an understanding of all major issues impeding the proposed technical approach, and clearly identify the particular barrier(s) that will be the target of the research effort.
- Identify the testing and diagnostics to be performed to understand the causes of the issues being addressed, and identify methods and technologies to mitigate those issues.

AOI 1 Special Deliverables

In addition to the deliverables required in the Federal Assistance Reporting Requirements Checklist, awards made under AOI 1 are required to provide test results from Phase 1 cells and a short 3-4 page Battery Materials Research Report due on a quarterly basis (specifics to be provided post selection).

Area of Interest (AOI 2): Integrated Computational Materials Engineering (ICME) Development of Low Cost Carbon Fiber for Lightweight Vehicles

AOI 2 Objective

The objective of this AOI is to simultaneously develop low cost carbon fiber (CF) precursor technology to support immediate weight reduction in Light duty vehicles while also advancing Integrated Computational Materials Engineering (ICME) techniques to support a reduced development-to deployment lead time in all lightweight materials systems. For the purposes of this AOI, CF is defined as a material consisting of thin, strong multi-crystalline filaments of carbon used as a reinforcement material, especially in resins also having the following mechanical and cost requirements:

- Cost at less than or equal to \$5/lb (2010 dollars);
- Strength of greater than or equal to 250Ksi;
- Modulus of greater than or equal to 25Msi; and
- Strain of greater than or equal to 1%.

AOI 2 General Requirements

Applications within this AOI will focus on a “foundational engineering problem” (FEP)¹ approach to using ICME techniques for the cost-effective reduction of vehicle weight through the development and validation of low cost carbon fiber for use in composites.

Applications will use an ICME approach to predict, design, develop, and optimize precursor chemistry (petroleum and non-petroleum derived) for candidates that meet the requirements described above. The ICME approach should employ tools linking micro to macroscale models to optimize structure/property and process/property relationships while taking into account uncertainty to accurately predict how a low cost precursor fiber transforms to low cost CF and its properties. Projects will develop and integrate a suite of computational tools that can accurately predict precursors for low cost carbon fiber. Validation of these tools will yield predictions of the chemical and physical structure of a family of optimized precursors. Models will be validated using actual performance data.

A system of models should be integrated in such a manner that fiber properties (load to failure, failure mode, stiffness/deflection, dynamic performance, microstructures) may be observed and predicted from the chemical structure and the process history. Tools and models developed under this AOI should be

¹ Integrated Computational Materials Engineering: A Transformational Discipline for Improved Competitiveness and National Security, National Academies Press: Washington, DC, 2008.

amenable to validation after the proposed project is complete by providing input into polymer composite ICME models where later validation of assembly-level properties could occur to enable the required weight reduction of vehicles. Therefore the output of the model integration should be compatible with required input for polymer composite models thus enabling future additional integration.

The integrated models will be capable of the minimum modeling element accuracies within 15% of measured properties.

A summary of attractive candidate precursors with justification and the cost analysis report shall be provided to the DOE at the end of the project. Applications that focus solely on a single precursor before the development and use of ICME tools to identify potential precursors are strongly discouraged.

Modeling Requirements:

The ICME approach will utilize an integrated collection of models to simulate the required constitutive behavior. These will contain robust, accurate and reliable constitutive models for each family of precursor materials under expected processing and use conditions including high-strain rates utilizing physics based models. Models will also include ICME methodologies to simulate the manufacturing process(es) (including variability from both process and material) including the evolution of thermo-chemical-mechanical material properties of complex systems as well as defects such as voids.

The approach will move from deterministic models with homogenized properties towards more realistic approaches to uncertainty and probabilistic consideration. This will include development, verification and validation of cost-effective and novel computational algorithms for fibers undergoing conversion to carbon and model-reduction techniques for modular and simplified analyses.

Full systems analysis will provide the capabilities to perform cost-effective and reliable predictions of a full nonlinear response of a complex system. Nonlinear response should include severe loading conditions, including dynamic crush and damage anticipated once incorporated into a composite. These analyses should enable full-system testing-reduction for non-regulatory and non-compliance tests.

Applications will provide a complete strategy for the ICME approach. The strategy will address key challenges in ICME and must include the following elements:

- Single length/timescale models; multi-scale models/coupled models; and multiphysics models that integrate process-structure-property relationships;
- Tool Maturity Level;
- Integration of the tools; and need for improved quantitative modeling tools;
- Integration strategy for the models;

- Required level of verification and validation;
- Minimum number of experiments needed to validate models;
- Integration of the impact of fiber architecture, design, and conditions of processing for predictive capabilities not only for structure/property relationships but also for process/property relationships; and
- A quantitative assessment of propagation of uncertainty for each of the models used and also for the integration of the suite of models.

The integrated suite of models will address process-structure-property relationships. These requirements are detailed under Integration Approach/Plan, below. The suite of models must include all of the following aspects:

- Variability from both process and material;
- Defects and voids;
- Development, verification and validation² of cost-effective and novel computational algorithms for very large systems;
- Model-reduction techniques for modular and simplified analyses; and
- Enable full systems analysis providing the capabilities to perform cost-effective and reliable predictions of a full nonlinear response of a complex system under "severe" loadings including dynamic crush and damage and enable full-system testing-reduction for non-regulatory and non-compliance tests.

Applications must include a gap analysis for areas that are not easily predicted with current tools/models.

Development of new and unique models is discouraged. However, if no model exists to perform the simulation or if current models are deficient in some manner, applications must make a compelling case for new model development. Justification must include a description of the deficiencies of current models with cited references or data, and a description of how a new model will address those deficiencies.

Integration Approach/Plan:

Applications must provide a plan for integration of ICME that contains³ 1) the ability to link data from different sources and knowledge domains; 2) networking and

² Table 4, page 29, Verification and validation of ICME methods and models for aerospace applications Bradford Cowles, Dan Backman, Rollie Dutton *Integrating Materials and Manufacturing Innovation* 2012, 1:2 (11 June 2012) <http://www.immijournal.com/content/supplementary/2193-9772-1-2-s2.pdf>

³ *Integrated Computational Materials Engineering: A Transformational Discipline for Improved Competitiveness and National Security*, National Academies Press: Washington, DC, 2008.

collaborative development; and 3) optimization. The interrelationships between activities must be clearly defined and illustrated.

Project plans must include the following requirements:

- Integration strategies for the models must address all required aspects including:
 - Integration techniques for multi-scale modeling;
 - Integration of different types of models;
 - The ability to link data from different sources and knowledge domains;
 - Networking and collaborative development;
 - Optimization;
 - Formulation of a technical approach through which an integrated set of experimental, computational, and data tools is applied to accelerate the research, development, and demonstration process;
 - A test and demonstration plan through which the performance and manufacturing cost of the component(s) are validated; and
 - A clear description of data and code planned for public release as well as the items that will be proposed as proprietary or business sensitive.
- The plan must describe HOW the applicant will ensure the completeness of the suite of models to be integrated to address the Modeling Requirements.

To support this effort and leverage carbon fiber characterization and scaleup resources within the DOE National Laboratory system, project teams are encouraged to interface with the LightMat Consortium (<http://LightMat.org>). The LightMat Consortium offers a single point of contact for industry-led teams to access and network DOE National Laboratory technical expertise in low cost carbon fiber R&D capabilities for accelerated development and collaboration support. The LightMat Consortium will be used as a repository of publicly-available data. Applications must provide a plan to disseminate results through the LightMat Consortium.

- Upon award, recipients will provide all public data and code (such as technical data used to support published journal articles or research code used for simulations) to LightMat for curation and hosting. This will include:
 - Any experimental measurements of materials properties and sample characteristics; and
 - Models and related code, unless the models and code contain proprietary or business-sensitive information, or the implementation is made commercially available.

- Upon award, recipients may, at their discretion, choose to access National Laboratory tools and expert researchers within the LightMat Consortium. Access to these tools will be provided by DOE at no cost to the project up to \$1M. Costs above \$1M must be paid for by the applicant outside of project costs. The specific National Laboratory resources planned for use under the project should be clearly identified in the application.

Teaming Requirements:

Applicants must include at least one automotive OEM or Tier 1 automotive supplier to provide automotive requirements. The team must also contain a member with manufacturing and scale up expertise not only in precursor development but also in carbon fiber. Applicants should include an integrated team of academic institutions to provide expertise in modeling and simulation. Teams must include at least one material supplier with expertise in the production of structural polymer composites. Budgetary information should be provided at a task level for each performing entity.

Dissemination of Data and Results:

Applicants will provide all public data and code (such as technical data used to support published journal articles or research code used for simulations) to the LightMat Consortium for curation and hosting. Proprietary and business-sensitive data are exempt from this requirement.

Recipients will make the data available to other researchers in the automotive materials community and the general public. Models and related code will be made available to other researchers and the general public unless the models and code contain sensitive information or the implementation is made commercially available.

AOI 2 Specific Requirements

Project Developmental Phases:

Projects will consist of two (2) sequential phases with a go/no go decision point at the completion of Phase 1.

Phase 1: Model Development and Model-Level Validation: Existing computational models will be improved, tested, and validated to provide the necessary output and level of detail. Phase 1 will include experimental and/or characterization work as necessary for model input and validation of individual models.

At the end of Phase 1, the following requirements will be met:

- Each of the proposed models is demonstrated as capable of producing the required outputs. Where applicable, outputs from models are used as inputs to other models to demonstrate the potential for integration.
- Each of the proposed models is validated against experimental results. If experimental results were used to provide input parameters for a model, then different experimental results must be used for validation. Validation requires that model results are within 15% of experimental results for all relevant outputs.
- Recipients will make non-protected data and code available to other researchers in the automotive materials community and the general public. This will include:
 - Any experimental measurements of materials properties and sample characteristics.
 - Models and related code, unless the models and code contain protected information or the implementation is made commercially available.
- All models that are compatible with commercial software (e.g. thermodynamic, finite element, etc.) must be implemented such that they can be run by an industry partner who is a user of the particular software package.
- Elements will be defined for input into a cost analysis for the identified precursor candidates which can be used to calculate the anticipated cost per pound as a means to compare candidates.

Phase 2 – Model Integration and Validation of carbon fiber precursors at a small scale: At the end of Phase 2 the following criteria will be met:

- Successful integration of the various models. This will be demonstrated by the ability to integrate models from different length scales, process history and local structure models, and local structure and local properties models to predict final properties of a manufactured CF.
- Non-protected data and code will be made available to other researchers in the automotive materials community and the general public.
- Tool Maturity Level will be defined and compared between the start and the completion of the project to quantify how efforts in this project matured the models.
- A quantitative assessment of propagation of uncertainty will be provided for each of the models used and also for the integration of the suite of models.
- A set of potential carbon fiber precursors with validated properties after being made on a small scale and achieving a go decision for additional scale up with more in-depth validation and testing.

AOI 2 Special Deliverables:

In addition to the deliverables required in the Federal Assistance Reporting Requirements Checklist, the following deliverables are required for awards made under AOI 2:

Phase 1 Topical Report

A comprehensive topical report will be provided that includes experimental and computational data and any publicly-releasable code, comparison of the computational and experimental results, and discussion. The report will contain a description of the current state of the art with respect to ICME of carbon fiber as well as how the work funded under this topic advanced the state of the art. The description will be as quantitative as possible, and include Phase 1 results and discussion.

Phase 2 Topical Report

A comprehensive topical report will be provided for Phase 2 activities, which includes experimental and computational data and any publicly-releasable code, comparison of the computational and experimental results, and discussion. It will include the following:

- A design for the FEP (foundational engineering problem) solution based on modeling results. The design must include details on the precursor material, structure, and processing of the FEP solution.
- A table demonstrating that integrated model results are within 15% of experimental results for all relevant outputs.
- Cost analysis and comparison to FOA targets.
- Discussion and documentation of the models (documentation) and data (simulated and experimentally derived) developed in Phase 1, and its availability to the automotive materials community and the general public.
- Requirements and performance validation.
- Phase 2 data models, and code: Applicants will provide all public data and code (such as technical data used to support published journal articles or research code used for simulations) to the LightMat Consortium for curation and hosting. Proprietary and business-sensitive data are exempt from this requirement.

Area of Interest (AOI 3): Emission Control Strategies for Advanced Combustion Engines

NOTE: Applications under this AOI are restricted to U.S. colleges, universities, and non-profit research institutions that operate as divisions under colleges or universities. See Section III (Eligibility Information) of the FOA for further information regarding eligibility. Applications that do not meet this eligibility requirement will be considered non-responsive.

AOI 3 Objective

The objective of AOI 3 is to research, develop, and demonstrate catalyst materials and after-treatment strategies that will enable vehicles with advanced combustion strategies to meet Tier 3 emissions standards (see <http://www.epa.gov/otaq/standards>) while achieving breakthrough thermal efficiencies.

VTO's Emission Control R&D focuses on developing efficient, durable, low-cost emission control systems that complement new combustion strategies. This effort is focused on advancing the state-of-the-art catalysis and after-treatment strategies for advanced combustion regimes including, but not limited to, Homogeneous-Charge Compression-Ignition, Lean Stratified Combustion, and Compression-Ignition Gasoline applications for passenger and commercial vehicle applications. Projects proposed will enable vehicles with advanced combustion engines to meet Tier 3 emissions standards and minimize the energy penalty of the after-treatment system. Applications may focus on light, medium or heavy duty vehicles.

Typical exhaust aftertreatment technologies include the following:

- NO_x adsorbers and selective catalytic reduction (SCR) to control oxides of nitrogen (NO_x).
- Oxidation catalysts to control hydrocarbons (HC).
- NO_x/HC traps to capture cold-start emissions.
- Particulate filters to control particulate matter (PM).

Examples of specific barriers include the following:

- Low NO_x conversion and CO/hydrocarbon oxidation occurs at low temperatures (150°C) during cold engine starting.
- NO_x absorbers incur a fuel energy penalty due to efficiencies that are dependent on temperature, are poisoned by sulfur in the fuel, and use expensive platinum group metals.
- Urea Selective Catalytic Reduction (urea SCR) technologies lose catalytic activity (catalyst deactivation) decreasing effectiveness, and creating products of incomplete reactions.
- Hydrocarbon SCR has a limited range of temperatures at which the conversion process is efficient and is generally in an early stage of development.
- Particulate filters become clogged and lose effectiveness over time. As such, they require more effective methods to regenerate them. They may also not be optimized for direct injection (DI) gasoline engines and may not be able to meet future regulations for particle number and size distribution.
- Oxidation catalysts lack durability at high temperatures and need to be more efficient at converting hydrocarbons, CO, and NO.

AOI 3 General Requirements

Applications must:

- Identify the expected improvements in conversion/oxidation efficiency and low and high temperature activity of the technologies developed when compared to current strategies.
- Identify the expected durability of the technology along with a comparison to current technologies.
- Include analysis, modeling, or simulation results which support projected efficiencies.
- Include plans for system requirements analysis, concept development, and component interface specification.
- Include plans for design, build, and component validation in laboratory setting.
- Include a test plan and data planned to result from testing.
- Include a plan to validate the performance of the developed technology on a bench or an engine level dynamometer demonstration.
- Include plans for cost analysis of the proposed technologies.

At a minimum, performance of the technology should be validated in a bench-type apparatus that closely simulates how the component will function in the vehicle application, however, testing the component as part of an engine system on a dynamometer is preferred.

AOI 3 Special Deliverables:

Aside from the deliverables required in the Federal Assistance Reporting Requirements Checklist, there are no special deliverables for AOI 3.

Area of Interest (AOI 4): Energy Efficient Mobility Systems Research and Development

AOI 4 Objective

Through AOI 4, VTO seeks to support novel research to develop unique technology solutions that enable energy efficient “smart” mobility systems. Specific emphasis will be given to concepts that support future transportation scenarios allowing for the efficient movement of people and/or goods in a way that maximizes energy efficiency and emissions reduction. Consideration will be given to connected and automated vehicle technologies, solutions applicable to multiple modes of transport suitable for the urban environment, and the fueling/charging infrastructure required to support consumer adoption of efficient mobility systems.

The full spectrum of technologies including hardware and non-hardware solutions relevant to efficient and environmentally friendly transportation technologies may be considered. Potential hardware solutions may include, but are not limited to:

advanced devices, sensors, components, or systems that reduce vehicle-level fuel consumption through connectivity, automation, or powertrain optimization; personal mobility solutions that incorporate novel materials and design concepts that result in transportation energy savings, compatible with future transportation scenarios that involve connectivity, automation, electrification, or shared mobility; and vehicle fueling/charging infrastructure solutions that enable future mobility scenarios including the efficient, autonomous movement of passengers and/or freight. Potential non-hardware solutions may include, but are not limited to: software and control algorithms that use real-time data to optimize vehicle or traffic behavior to achieve energy reductions; computational methods that incorporate artificial intelligence or machine learning to identify and leverage energy reduction opportunities in the transportation network; and research to develop modeling tools and methods that use connected vehicle data to answer questions about energy and mobility in future transportation scenarios.

AOI 4 General Requirements

Applications must:

- Quantify the expected energy benefits that would result from the deployment of the technology or application to be developed, supported by analysis, modeling, or simulation results. (Or, if the proposed research is to develop modeling tools that do not directly reduce energy use, the application must describe how the tool will advance the state of the art and accelerate the adoption of technologies that do have direct energy reduction benefits.)
- Include a test plan and description of data that will result from execution of the test plan. (Test plans for concepts which require large-scale deployment in order to achieve transportation system-wide benefits may incorporate other methods for validation, such as hardware-in-the-loop simulation, small-scale demonstration, or other means to operate the solution in the same manner as it would function in a vehicle or transportation system.)
- Include plans for cost analysis of the proposed technologies.
- Be consistent with, and not duplicate, previous and current Federal activities related to vehicle connectivity and automation, specifically by the U.S.

Department of Transportation's (DOT), Intelligent Transportation Systems Joint Program Office (ITS-JPO), including:

- Connected Vehicle Reference Implementation Architecture (CVRIA):
http://www.its.dot.gov/research_archives/arch/cvria_set2.htm
- Connected Vehicle Pilot Deployment Program:
<http://www.its.dot.gov/pilots/index.htm>
- Connected Vehicle Applications:
http://www.its.dot.gov/pilots/cv_pilot_apps.htm
- Proposed Rulemaking on V2V Communications:
<https://www.transportation.gov/briefing-room/us-dot-advances-deployment-connected-vehicle-technology-prevent-hundreds-thousands>

- To the extent possible, engage with the DOE SMART Mobility Laboratory Consortium to leverage models, tools, data, and expertise developed through the National Lab system.

Applications proposing the following are **strongly discouraged**:

- Commercial hardware technologies, products, and solutions;
- Large-scale demonstration projects of existing technologies;
- Incremental improvements to existing technologies, products, or solutions;
- Solutions, approaches, or technologies similar to those already being investigated through current or recent DOE projects;
- Solutions, approaches, or technologies similar to current or recent solicitations, solicitation topics or areas of interest, awards, prizes, or announcements from DOE; and
- Technologies that are not based on sound scientific principles (e.g., violates the law of thermodynamics).

AOI 4 Special Deliverables:

Aside from the deliverables required in the Federal Assistance Reporting Requirements Checklist, there are no special deliverables.

C. Applications Specifically Not of Interest

The following types of applications will be deemed nonresponsive and will not be reviewed or considered (See Section III.D of the FOA):

- Applications that fall outside the technical parameters specified in Section I.B of the FOA.
- Applications for proposed technologies that are not based on sound scientific principles (e.g., violates the laws of thermodynamics).

D. Authorizing Statutes

The programmatic authorizing statute is Public Law 102-486, Energy Policy Act (EPA) of 1992, as amended by Public Law 109-58, of EPA 2005; the Energy Independence and Security Act (EISA, Public Law 110-140).

Awards made under this announcement will fall under the purview of 2 CFR Part 200 as amended by 2 CFR Part 910.

II. Award Information

A. Award Overview

i. Estimated Funding

EERE expects to make approximately \$19,700,000 of Federal funding available for new awards under this FOA, subject to the availability of appropriated funds. EERE anticipates making approximately 15-30 awards under this FOA. EERE may issue one, multiple, or no awards. Individual awards may vary between \$200,000 and \$7,500,000.

The anticipated total Federal funding and the approximate maximum and minimum Federal Share for any one individual award made under this announcement are set forth in the table below.

One or more projects awarded may be managed collaboratively with the U.S. Army Tank Automotive Research Development and Engineering Center (TARDEC). A separate agreement with TARDEC will not be required.

AOI Number	Area of Interest	Anticipated Minimum Award Size for Any One Individual Award (Fed Share)	Anticipated Maximum Award Size for Any One Individual Award (Fed Share)	Approximate Total Federal Funding Available for All Awards
1	Battery500 Seedling Projects*	\$200,000	\$400,000	\$4,000,000
2	Integrated Computational Materials Engineering Predictive Tools for Low-Cost Carbon Fiber	\$2,000,000	\$3,750,000	\$7,500,000
3	Emission Control Strategies for Advanced Combustion Engines**	\$1,000,000	\$2,100,000	\$4,200,000

4	Energy Efficient Mobility Systems Research and Development	\$750,000	\$2,000,000	\$4,000,000
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Notes:

*AOI 1 is subject to Phase 2 down select. See AOI technical discussion.

**AOI 3 Eligibility restricted to U.S. colleges, universities, and non-profit research institutions which operate as divisions under colleges or universities through determination of restricted eligibility, dated September 27, 2016. See AOI discussion below and the eligibility section of the FOA.

Please refer to the eligibility section of the FOA for eligibility requirements for all other areas of interest within this FOA.

EERE may establish more than one budget period for each award and fund only the initial budget period(s). Funding for all budget periods, including the initial budget period, is not guaranteed. Funding for all awards is contingent upon the availability of funds appropriated by Congress for the purpose of this program and the availability of future year budget authority (if applicable) for funds provided by DOE.

ii. Period of Performance

EERE anticipates making awards from 18 - 48 months in length. Project continuation will be contingent upon satisfactory performance and go/no-go decision review. At the go/no-go decision points, EERE will evaluate project performance, project schedule adherence, meeting milestone objectives, compliance with reporting requirements, and overall contribution to the program goals and objectives. As a result of this evaluation, EERE will make a determination to continue the project, re-direct the project, or discontinue funding the project.

One or more projects awarded may be managed collaboratively with the U.S. Army Tank Automotive Research Development and Engineering Center (TARDEC). A separate agreement with TARDEC will not be required.

AOI Number	Area of Interest	Anticipated Number of Awards	Anticipated Period of Performance
1	Battery500 Seedling Projects*	10 - 20	18 Months
2	Integrated Computational Materials Engineering Predictive Tools for Low-Cost Carbon Fiber	1-2	36 Months

3	Emission Control Strategies for Advanced Combustion Engines**	2 - 4	36 Months
4	Energy Efficient Mobility Systems Research and Development	3 - 4	24 Months
Notes: *AOI 1 is subject to Phase 2 down select. See AOI technical discussion. **AOI 3 Eligibility restricted to U.S. colleges, universities, and non-profit research institutions which operate as divisions under colleges or universities through determination of restricted eligibility, dated September 27, 2016. See AOI discussion below and the eligibility section of the FOA. Please refer to the eligibility section of the FOA for eligibility requirements for all other areas of interest within this FOA.			

iii. New Applications Only

EERE will accept only new applications under this FOA. EERE will not consider applications for renewals of existing EERE-funded awards through this FOA.

B. EERE Funding Agreements

Through Cooperative Agreements and other similar agreements, EERE provides financial and other support to projects that have the potential to realize the FOA objectives. EERE does not use such agreements to acquire property or services for the direct benefit or use of the United States Government.

i. Cooperative Agreements

EERE generally uses Cooperative Agreements to provide financial and other support to Prime Recipients. Through Cooperative Agreements, EERE provides financial or other support to accomplish a public purpose of support or stimulation authorized by Federal statute. Under Cooperative Agreements, the Government and Prime Recipients share responsibility for the direction of projects.

EERE has substantial involvement in all projects funded via Cooperative Agreement. See Section VI.B.9 of the FOA for more information on what substantial involvement may involve.

ii. Funding Agreements with FFRDCs

In most cases, Federally Funded Research and Development Centers (FFRDC) are funded independently of the remainder of the Project Team. The FFRDC then executes an agreement with any non-FFRDC Project Team members to arrange work structure, project execution, and any other matters. Regardless of these arrangements, the entity that applied as the

Prime Recipient for the project will remain the Prime Recipient for the project.

III. Eligibility Information

To be considered for substantive evaluation, an applicant's submission must meet the criteria set forth below. If the application does not meet these initial requirements, it will be considered non-responsive, removed from further evaluation, and ineligible for any award.

A. Eligible Applicants

i. Restricted Eligibility

The National Energy Technology Laboratory and U.S. Army Tank Automotive Research Development and Engineering Center (TARDEC) are ineligible to participate as a prime applicant or as a team member/sub-recipient on another entities application because of each entities role in developing the requirements for this announcement.

Entities applying as the prime applicant under AOI 3 "Emission Control Strategies for Advanced Combustion Engines" are restricted to U.S. colleges, universities, and non-profit research institutions that operate as divisions under colleges or universities. Eligibility will not be restricted for the other areas of interest within this FOA. All other entities that submit an application as a prime applicant to this AOI will be considered non-responsive and the application will not be reviewed. The restricted eligibility does not apply to entities applying as a subrecipient.

ii. Performance of Work in the United States

a. Requirement

All work performed under EERE Awards must be performed in the United States (100% of all direct labor, including contract/subrecipient labor). This requirement does not apply to the purchase of supplies and equipment; however, the Prime Recipient should make every effort to purchase supplies and equipment within the United States. The Prime Recipient must flow down this requirement to its Subrecipients.

b. Failure to Comply

If the Prime Recipient fails to comply with the Performance of Work in the United States requirement, EERE may deny reimbursement for the work conducted outside the United States and such costs may not

be recognized as allowable recipient cost share. The Prime Recipient is responsible should any work under this Award be performed outside the United States, absent a waiver, regardless of if the work is performed by the Prime Recipient, Subrecipients, contractors or other project partners.

c. Waiver

There may be limited circumstances where it is in the interest of the project to perform a portion of the work outside the United States. To seek a waiver of the Performance of Work in the United States requirement, the applicant must submit a written waiver request to EERE. Appendix C lists the necessary information that must be included in a request to waive the Performance of Work in the United States requirement.

The applicant must demonstrate to the satisfaction of EERE that a waiver would further the purposes of the FOA and is in the economic interests of the United States. EERE may require additional information before considering a waiver request. Save the waiver request(s) in a single PDF file titled “ControlNumber_PerformanceofWork_Waiver”. The applicant does not have the right to appeal EERE’s decision concerning a waiver request.

iii. Individuals

U.S. citizens and lawful permanent residents are eligible to apply for funding as a Prime Recipient or Subrecipient.

iv. Domestic Entities

For-profit entities, educational institutions, and nonprofits that are incorporated (or otherwise formed) under the laws of a particular State or territory of the United States are eligible to apply for funding as a Prime Recipient or Subrecipient.

State, local, and tribal government entities are eligible to apply for funding as a Prime Recipient or Subrecipient.

For all areas of interest **except** AOI 1 “Battery500 Seedling Projects,” DOE/NSA Federally Funded Research and Development Centers (FFRDCs) are eligible to apply for funding as a Subrecipient, but are not eligible to apply as a Prime Recipient.

For the area of interest entitled “Battery500 Seedling Projects” (AOI 1), DOE/NNSA Federally Funded Research and Development Centers (FFRDCs) are eligible to apply for funding as a Prime Recipient or Subrecipient.

Non-DOE/NNSA FFRDCs are eligible to apply for funding as a Subrecipient, but are not eligible to apply as a Prime Recipient.

Federal agencies and instrumentalities (other than DOE) are eligible to apply for funding as a Subrecipient, but are not eligible to apply as a Prime Recipient.

v. Foreign Entities

Other than as provided in the “Individuals” or “Domestic Entities” sections above, all Prime Recipients receiving funding under this FOA must be incorporated (or otherwise formed) under the laws of a State or territory of the United States. If a foreign entity applies for funding as a Prime Recipient, it must designate in the Full Application a subsidiary or affiliate incorporated (or otherwise formed) under the laws of a State or territory of the United States to be the Prime Recipient. The Full Application must state the nature of the corporate relationship between the foreign entity and domestic subsidiary or affiliate.

A foreign entity may receive funding as a Subrecipient.

vi. Incorporated Consortia

Incorporated consortia, which may include domestic and/or foreign entities, are eligible to apply for funding as a Prime Recipient or Subrecipient. For consortia incorporated (or otherwise formed) under the laws of a State or territory of the United States, please refer to “Domestic Entities” above. For consortia incorporated in foreign countries, please refer to the requirements in “Foreign Entities” above.

Each incorporated consortium must have an internal governance structure and a written set of internal rules. Upon request, the consortium must provide a written description of its internal governance structure and its internal rules to the EERE Contracting Officer.

vii. Unincorporated Consortia

Unincorporated Consortia, which may include domestic and foreign entities, must designate one member of the consortium to serve as the Prime Recipient/consortium representative. The Prime Recipient/consortium representative must be incorporated (or otherwise formed) under the laws of a State or territory of the United States. The eligibility of the consortium

will be determined by the eligibility of the Prime Recipient/consortium representative under Section III.A of the FOA.

Upon request, unincorporated consortia must provide the EERE Contracting Officer with a collaboration agreement, commonly referred to as the articles of collaboration, which sets out the rights and responsibilities of each consortium member. This agreement binds the individual consortium members together and should discuss, among other things, the consortium's:

- Management structure;
- Method of making payments to consortium members;
- Means of ensuring and overseeing members' efforts on the project;
- Provisions for members' cost sharing contributions; and
- Provisions for ownership and rights in intellectual property developed previously or under the agreement.

B. Cost Sharing

Cost share is based on the total allowable costs of the project (i.e. sum of the Government share, including FFRDC costs if applicable, and the recipient share of allowable costs equals the total allowable cost of the project) and must come from non-Federal sources unless otherwise allowed by law.

The Assistant Secretary for the Office of Energy Efficiency and Renewable Energy has issued a Cost Share Reduction determination pursuant to Section 988(b)(3) of the Energy Policy Act of 2005 that is applicable to certain entities applying under this FOA. This determination applies to all Areas of Interest. Specifically, the recipient cost share requirement for applied research and development activities projects is reduced to 10% and applied when:

1. The Prime Recipient is a domestic institution of higher education; domestic nonprofit entity; FFRDC; or U.S. State, local, or tribal government entity; and
2. The Prime Recipient performs more than 50% of the project work, as measured by the Total Project Cost.

Prime Applicants who do not qualify for the cost share reduction must meet the minimum cost share requirements for the total cost of the project (including that portion of the work performed by subawardees who are a domestic institution of higher education; a domestic nonprofit, or U.S. State, local or tribal government; a Federal Laboratory; or an FFRDC) as established in the table below according to the AOI.

Applicants who believe their project qualifies for the reduced recipient cost share must be able to provide verification that the above requirements are satisfied.

The minimum cost share required for each AOI for different types of Applicants is as follows:

One or more projects awarded may be managed collaboratively with U.S. Army Tank Automotive Research Development and Engineering Center (TARDEC). A separate agreement with TARDEC will not be required.

AOI Number	Area of Interest	Minimum Cost Share for For-Profit Entities	Minimum Cost Share for Universities and Domestic Non-Profits
1	Battery500 Seedling Projects*	≥20%	≥10%
2	Integrated Computational Materials Engineering Predictive Tools for Low-Cost Carbon Fiber	≥20%	≥10%
3	Emission Control Strategies for Advanced Combustion Engines**	N/A	≥10%
4	Energy Efficient Mobility Systems	≥20%	≥10%
Notes: *AOI 1 is subject to Phase 2 down select. See AOI technical discussion. **AOI 3 Eligibility restricted to U.S. colleges, universities, and non-profit research institutions which operate as divisions under colleges or universities through determination of restricted eligibility, dated September 27, 2016. See AOI discussion below and the eligibility section of the FOA. Please refer to the eligibility section of the FOA for eligibility requirements for all other areas of interest within this FOA.			

To assist applicants in calculating proper cost share amounts, EERE has included a cost share information sheet and sample cost share calculation as Appendices B and C to this FOA.

i. Legal Responsibility

Although the cost share requirement applies to the project as a whole, including work performed by members of the project team other than the Prime Recipient, the Prime Recipient is legally responsible for paying the entire cost share. The Prime Recipient's cost share obligation is expressed in the Assistance Agreement as a static amount in U.S. dollars (cost share amount) and as a percentage of the Total Project Cost (cost share percentage). If the funding agreement is terminated prior to the end of the project period, the Prime Recipient is required to contribute at least the cost

share percentage of total expenditures incurred through the date of termination.

The Prime Recipient is solely responsible for managing cost share contributions by the Project Team and enforcing cost share obligation assumed by Project Team members in subawards or related agreements.

ii. Cost Share Allocation

Each Project Team is free to determine how best to allocate the cost share requirement among the team members. The amount contributed by individual Project Team members may vary, as long as the cost share requirement for the project as a whole is met.

iii. Cost Share Types and Allowability

Every cost share contribution must be allowable under the applicable Federal cost principles, as described in Section IV.J.1 of the FOA. In addition, cost share must be verifiable upon submission of the Full Application.

Project Teams may provide cost share in the form of cash or in-kind contributions. Cash contributions may be provided by the Prime Recipient or Subrecipients. Allowable in-kind contributions include, but are not limited to: rental value of buildings or equipment, the value of a donated service or resource, or third party in-kind contribution.

Project teams may use funding or property received from state or local governments to meet the cost share requirement, so long as the funding was not provided to the state or local government by the Federal Government.

The Prime Recipient may not use the following sources to meet its cost share obligations including, but not limited to:

- Revenues or royalties from the prospective operation of an activity beyond the project period;
- Proceeds from the prospective sale of an asset of an activity;
- Federal funding or property (e.g., Federal grants, equipment owned by the Federal Government); or
- Expenditures that were reimbursed under a separate Federal Program.

Project Teams may not use the same cash or in-kind contributions to meet cost share requirements for more than one project or program.

Cost share contributions must be specified in the project budget, verifiable from the Prime Recipient's records, and necessary and reasonable for proper

and efficient accomplishment of the project. As all sources of cost share are considered part of total project cost, the cost share dollars will be scrutinized under the same Federal regulations as Federal dollars to the project. Every cost share contribution must be reviewed and approved in advance by the Contracting Officer and incorporated into the project budget before the expenditures are incurred.

Applicants are encouraged to refer to 2 CFR 200.306 as amended by 2 CFR 910.130 & 10 CFR 603.525-555 for additional guidance on cost sharing.

iv. Cost Share Contributions by FFRDCs

Because FFRDCs are funded by the Federal Government, costs incurred by FFRDCs generally may not be used to meet the cost share requirement. FFRDCs may contribute cost share only if the contributions are paid directly from the contractor's Management Fee or another non-Federal source.

v. Cost Share Verification

Applicants are required to provide written assurance of their proposed cost share contributions in their Full Applications.

Upon selection for award negotiations, applicants are required to provide additional information and documentation regarding their cost share contributions. Please refer to Appendix A of the FOA.

vi. Cost Share Payment

All proposed cost share contributions must be reviewed in advance by the Contracting Officer and incorporated into the project budget before the expenditures are incurred.

EERE requires Prime Recipients to contribute the cost share amount incrementally over the life of the award. Cumulative invoices received must reflect, at a minimum, the cost sharing percentage specified in the award at the conclusion of each budget period or at some negotiated timeframe within each budget period, i.e. every three or six months. If the Award is terminated or discontinued, the Recipient shall refund sufficient funds to the Government in order to achieve the Recipient's cost-share percentage based on total allowable project cost.

C. Compliance Criteria

Concept Papers and Full Applications must meet all Compliance criteria listed below or they will be considered noncompliant. EERE will not review or consider noncompliant submissions, including Concept Papers and Full Applications that

were submitted through means other than EERE Exchange, submitted after the applicable deadline, and/or submitted incomplete. EERE will not extend the submission deadline for applicants that fail to submit required information due to server/connection congestion.

i. Compliance Criteria

a. Concept Papers

Concept Papers are deemed compliant if:

- The Concept Paper complies with the content and form requirements in Section IV.C of the FOA; and
- The applicant successfully uploaded all required documents and clicked the “Submit” button in EERE Exchange by the deadline stated in this FOA.

b. Full Applications

Full Applications are deemed compliant if:

- The applicant submitted a compliant Concept Paper;
- The Full Application complies with the content and form requirements in Section IV.D of the FOA; and
- The applicant successfully uploaded all required documents and clicked the “Submit” button in EERE Exchange by the deadline stated in the FOA.

D. Other Eligibility Requirements

i. Requirements for DOE/NNSA Federally Funded Research and Development Centers (FFRDC) Listed as the Applicant

A DOE/NNSA FFRDC is eligible to apply for funding under this FOA if its cognizant Contracting Officer provides written authorization and this authorization is submitted with the application. If a DOE/NNSA FFRDC is selected for award negotiation, the proposed work will be authorized under the DOE work authorization process and performed under the laboratory’s Management and Operating (M&O) contract.

The following wording is acceptable for the authorization:

Authorization is granted for the [Enter Laboratory Name] Laboratory to participate in the proposed project. The work proposed for the laboratory is consistent with or complementary to the missions of the laboratory, and will not adversely impact execution of the DOE assigned programs at the laboratory.

ii. Requirements for DOE/NNSA and non-DOE/NNSA Federally Funded Research and Development Centers Included as a Subrecipient

DOE/NNSA and non-DOE/NNSA FFRDCs may be proposed as a Subrecipient on another entity's application subject to the following guidelines:

a. Authorization for non-DOE/NNSA FFRDCs

The Federal agency sponsoring the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The use of a FFRDC must be consistent with its authority under its award.

b. Authorization for DOE/NNSA FFRDCs

The cognizant Contracting Officer for the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The following wording is acceptable for this authorization:

Authorization is granted for the [Enter Laboratory Name] Laboratory to participate in the proposed project. The work proposed for the laboratory is consistent with or complementary to the missions of the laboratory, and will not adversely impact execution of the DOE assigned programs at the laboratory.

c. Value/Funding

The value of and funding for the FFRDC portion of the work will not normally be included in the award to a successful applicant. Usually, DOE will fund a DOE/NNSA FFRDC contractor through the DOE field work proposal system and non-DOE/NNSA FFRDC through an interagency agreement with the sponsoring agency.

d. Cost Share

Although the FFRDC portion of the work is usually excluded from the award to a successful applicant, the applicant's cost share requirement will be based on the total cost of the project, including the applicant's and the FFRDC's portions of the project.

e. Responsibility

The Prime Recipient will be the responsible authority regarding the settlement and satisfaction of all contractual and administrative issues including, but not limited to disputes and claims arising out of any agreement between the Prime Recipient and the FFRDC contractor.

E. Limitation on Number of Concept Papers and Full Applications Eligible for Review

Applicants may submit more than one Concept paper and Full Application to this FOA, provided that each application describes a unique, scientifically distinct project. All concept papers and applications must be for a stand-alone project that is not dependent or contingent upon another application submitted to this or any other FOA.

F. Questions Regarding Eligibility

EERE will not make eligibility determinations for potential applicants prior to the date on which applications to this FOA must be submitted. The decision whether to submit an application in response to this FOA lies solely with the applicant.

IV. Application and Submission Information

A. Application Process

The application process will include two phases: a Concept Paper phase and a Full Application phase. **Only applicants that have submitted an eligible Concept Paper will be eligible to submit a Full Application.** At each phase, EERE performs an initial eligibility review of the applicant submissions to determine whether they meet the eligibility requirements of Section III of the FOA. EERE will not review or consider submissions that do not meet the eligibility requirements of Section III. All submissions must conform to the following form and content requirements, including maximum page lengths (described below) and must be submitted via EERE Exchange at <https://eere-exchange.energy.gov/>, unless specifically stated otherwise. **EERE will not review or consider submissions submitted through means other than EERE Exchange, submissions submitted after the applicable deadline, and incomplete submissions.** EERE will not extend deadlines for applicants who fail to submit required information and documents due to server/connection congestion. A control number will be issued when an applicant begins the Exchange application process. This control number must be included with all Application documents, as described below.

The Concept Paper and Full Application must conform to the following requirements:

- Each must be submitted in Adobe PDF format unless stated otherwise.
- Each must be written in English.
- All pages must be formatted to fit on 8.5 x 11 inch paper with margins not less than one inch on every side. Use Times New Roman typeface, a black font color, and a font size of 12 point or larger (except in figures or tables, which may be 10 point font). A symbol font may be used to insert Greek

letters or special characters, but the font size requirement still applies. References must be included as footnotes or endnotes in a font size of 10 or larger. Footnotes and endnotes are counted toward the maximum page requirement.

- The Control Number must be prominently displayed on the upper right corner of the header of every page. Page numbers must be included in the footer of every page.
- Each submission must not exceed the specified maximum page limit, including cover page, charts, graphs, maps, and photographs when printed using the formatting requirements set forth above and single spaced. If applicants exceed the maximum page lengths indicated below, EERE will review only the authorized number of pages and disregard any additional pages.

Applicants are responsible for meeting each submission deadline. **Applicants are strongly encouraged to submit their Concept Papers and Full Applications at least 48 hours in advance of the submission deadline.** Under normal conditions (i.e., at least 48 hours in advance of the submission deadline), applicants should allow at least 1 hour to submit a Concept Paper and Full Application. Once the Concept Paper and Full Application is submitted in EERE Exchange, applicants may revise or update that submission until the expiration of the applicable deadline. If changes are made, the applicant must resubmit the Concept Paper and Full Application before the applicable deadline.

EERE urges applicants to carefully review their Concept Papers and Full Applications and to allow sufficient time for the submission of required information and documents. All Full Applications that pass the initial eligibility review will undergo comprehensive technical merit review according to the criteria identified in Section V.A.2 of the FOA.

i. Additional Information on EERE Exchange

EERE Exchange is designed to enforce the deadlines specified in this FOA. The “Apply” and “Submit” buttons will automatically disable at the defined submission deadlines. Should applicants experience problems with Exchange, the following information may be helpful.

Applicants that experience issues with submission PRIOR to the FOA deadline: In the event that an applicant experiences technical difficulties with a submission, the Application should contact the Exchange helpdesk for assistance (EERE-ExchangeSupport@hq.doe.gov). The Exchange helpdesk and/or the EERE Exchange system administrators will assist Applicants in resolving issues.

Applicants that experience issue with submissions that result in late submissions: In the event that an applicant experiences technical difficulties so severe that they are unable to submit their application by the deadline, the applicant should contact the Exchange helpdesk for assistance (EERE-ExchangeSupport@hq.doe.gov). The Exchange helpdesk and/or the EERE Exchange system administrators will assist the applicant in resolving all issues (including finalizing submission on behalf of and with the applicant's concurrence). PLEASE NOTE, however, those applicants who are unable to submit their application on time due to their waiting until the last minute when network traffic is at its heaviest to submit their materials will not be able to use this process.

B. Application Forms

The application forms and instructions are available on EERE Exchange. To access these materials, go to <https://eere-Exchange.energy.gov> and select the appropriate funding opportunity number.

Note: The maximum file size that can be uploaded to the EERE Exchange website is 10MB. Files in excess of 10MB cannot be uploaded, and hence cannot be submitted for review. If a file exceeds 10MB but is still within the maximum page limit specified in the FOA, it must be broken into parts and denoted to that effect. For example:

ControlNumber_LeadOrganization_Project_Part_1
ControlNumber_LeadOrganization_Project_Part_2, etc.

C. Content and Form of the Concept Paper

To be eligible to submit a Full Application, applicants must submit a Concept Paper by the specified due date and time.

i. Concept Paper Content Requirements

EERE will not review or consider ineligible Concept Papers (see Section III of the FOA).

Each Concept Paper must be limited to a single concept or technology. Unrelated concepts and technologies should not be consolidated into a single Concept Paper.

The Concept Paper must conform to the following content requirements:

Section	Page Limit	Description
Cover Page	1 page maximum	The cover page should include the project title, the specific FOA Topic Area being addressed (if applicable), both the technical and business points of contact, names of all team member organizations, and any statements regarding confidentiality.
Technology Description	2 pages maximum	<p>Applicants are required to describe succinctly:</p> <ul style="list-style-type: none"> • The proposed technology, including its basic operating principles and how it is unique and innovative; • The proposed technology's target level of performance (applicants should provide technical data or other support to show how the proposed target could be met); • The current state-of-the-art in the relevant field and application, including key shortcomings, limitations, and challenges; • How the proposed technology will overcome the shortcomings, limitations, and challenges in the relevant field and application; • The potential impact that the proposed project would have on the relevant field and application; • The key technical risks/issues associated with the proposed technology development plan; and • The impact that EERE funding would have on the proposed project.
Addendum	2 pages maximum	<p>Applicants are required to describe succinctly the qualifications, experience, and capabilities of the proposed Project Team, including:</p> <ul style="list-style-type: none"> • Whether the Principal Investigator (PI) and Project Team have the skill and expertise needed to successfully execute the project plan; • Whether the applicant has prior experience which demonstrates an ability to perform tasks of similar risk and complexity; • Whether the applicant has worked together with its teaming partners on prior projects or programs; and • Whether the applicant has adequate access to equipment and facilities necessary to accomplish the effort and/or clearly explain how it intends to obtain access to the necessary equipment and facilities. <p>Applicants may provide graphs, charts, or other data to supplement their Technology Description.</p>

EERE makes an independent assessment of each Concept Paper based on the criteria in Section V.A.i of the FOA. EERE will encourage a subset of applicants to submit Full Applications. Other applicants will be discouraged from submitting a Full Application. An applicant who receives a “discouraged” notification may still submit a Full Application. EERE will review all eligible Full Applications. However, by discouraging the submission of a Full Application, EERE intends to convey its lack of programmatic interest in the proposed project in an effort to save the applicant the time and expense of preparing an application that is unlikely to be selected for award negotiations.

In order to provide Applicants with feedback on their concept papers, EERE will include general comments on an Applicant’s Concept Paper in the discourage notification sent to applicants at the close of that phase. Applicants who receive an “encourage” notification will not be provided with comments.

While the content and form of the Concept Paper does not require proposing a cost share amount during this concept paper submission phase, the Exchange system will require entering a proposed cost share as a step in the submission process. Any proposed cost share at the Concept Paper stage of the application process can be updated or amended at the time of full application submission.

D. Content and Form of the Full Application

Applicants must submit a Full Application by the specified due date and time to be considered for funding under this FOA. Applicants must complete the following application forms found on the EERE Exchange website at <https://eere-Exchange.energy.gov/>, in accordance with the instructions.

All Full Application documents must be marked with the Control Number issued to the applicant. Applicants will receive a control number upon submission of their Concept Paper, and should include that control number in the file name of their Full Application submission (i.e., Control number_Applicant Name_Full Application)."

i. Full Application Content Requirements

EERE will not review or consider ineligible Full Applications (see Section III of the FOA).

Each Full Application shall be limited to a single concept or technology. Unrelated concepts and technologies shall not be consolidated in a single Full Application.

Full Applications must conform to the following requirements:

Submission	Components	File Format	File Name
Full Application (PDF, unless stated otherwise)	Technical Volume (See Chart in Section IV.D.2) (30 page limit)	PDF	ControlNumber_LeadOrganization_TechnicalVolume
	Statement of Project Objectives (Applicants must use the template available in EERE Exchange) (10 page limit)	Microsoft Word	ControlNumber_LeadOrganization_SOPO
	SF-424 (Applicants must use the template available in EERE Exchange)	PDF	ControlNumber_LeadOrganization_App424
	Budget Justification (EERE 335) (Applicants must use the template available in EERE Exchange)	Microsoft Excel	ControlNumber_LeadOrganization_Budget_Justification
	Summary for Public Release (1 page limit)	PDF, Microsoft Word	ControlNumber_LeadOrganization_Summary
	Summary Slide (1 page limit) (Applicants must use the template available in EERE Exchange)	Microsoft PowerPoint	ControlNumber_LeadOrganization_Slide
	Subaward Budget Justification, if applicable (EERE 335) Applicants must use the template available in EERE Exchange)	Microsoft Excel	ControlNumber_LeadOrganization_Subaward_Budget_Justification
	Budget for FFRDC, if applicable (EERE 335) (Applicants must use the template available in EERE Exchange)	Microsoft Excel	ControlNumber_LeadOrganization_FWP
	Authorization from cognizant Contracting Officer for FFRDC, if applicable	PDF, Microsoft Word	ControlNumber_LeadOrganization_FFRDCAuth
	SF-LLL Disclosure of Lobbying Activities (Applicants must use the template available in EERE Exchange)	PDF, Microsoft Word	ControlNumber_LeadOrganization_SF-LLL
	Performance of Work in the United States waiver requests, if applicable	PDF, Microsoft Word	ControlNumber_LeadOrganization_Waiver
	U.S. Manufacturing Plans (Required if applying to AOIs 1, 3, and 4)	PDF, Microsoft Word	ControlNumber_LeadOrganization_USMP
	Letters of Commitment (if applicable)	PDF	ControlNumber_LeadOrganization_LOC
	Environmental Questionnaire (EQ) (Applicants must use the template available in EERE Exchange)	PDF	ControlNumber_LeadOrganization_EQ

Note: The maximum file size that can be uploaded to the EERE Exchange website is 10MB. Files in excess of 10MB cannot be uploaded, and hence cannot be submitted for review. If a file exceeds 10MB but is still within the

maximum page limit specified in the FOA it must be broken into parts and denoted to that effect. For example:

ControlNumber_LeadOrganization_TechnicalVolume_Part_1
ControlNumber_LeadOrganization_TechnicalVolume_Part_2, etc.

EERE will not accept late submissions that resulted from technical difficulties due to uploading files that exceed 10MB.

EERE provides detailed guidance on the content and form of each component below.

ii. Technical Volume

The Technical Volume must be submitted in Adobe PDF format. The Technical Volume must conform to the following content and form requirements, including maximum page lengths. If applicants exceed the maximum page lengths indicated below, EERE will review only the authorized number of pages and disregard any additional pages. This volume must address the Merit Review Criteria as discussed in Section V.A.2 of the FOA. Save the Technical Volume in a single PDF file using the following convention for the title: "ControlNumber_LeadOrganization_TechnicalVolume".

Applicants must provide sufficient citations and references to the primary research literature to justify the claims and approaches made in the Technical Volume. However, EERE and reviewers are under no obligation to review cited sources.

The Technical Volume to the Full Application may not be more than 30 pages, including the cover page, table of contents, and all citations, charts, graphs, maps, photos, or other graphics, and must include all of the information in the table below. The applicant should consider the weighting of each of the evaluation criteria (see Section V.A.2 of the FOA) when preparing the Technical Volume.

Technical Volume Content for Areas of Interest 1 "Battery500 Seedling Projects," AOI 3 "Emission Control Strategies for Advanced Combustion Engines," and AOI 4 "Energy Efficient Mobility Systems Research and Development"

SECTION/PAGE LIMIT	DESCRIPTION
Cover Page	The cover page should include the project title, the specific FOA Topic Area being addressed (if applicable), both the technical and business points of contact, names of all team member organizations, and any statements regarding confidentiality.

<p>Project Overview (This section should constitute approximately 10% of the Technical Volume)</p>	<p>The Project Overview should contain the following information:</p> <ul style="list-style-type: none"> • Background: The applicant should discuss the background of their organization, including the history, successes, and current research and development status (i.e., the technical baseline) relevant to the technical topic being addressed in the Full Application. • Project Goal: The applicant should explicitly identify the targeted improvements to the baseline technology and the critical success factors in achieving that goal. • DOE Impact: The applicant should discuss the impact that DOE funding would have on the proposed project. Applicants should specifically explain how DOE funding, relative to prior, current, or anticipated funding from other public and private sources, is necessary to achieve the project objectives.
<p>Technical Description, Innovation, and Impact (This section should constitute approximately 30% of the Technical Volume)</p>	<p>The Technical Description should contain the following information:</p> <ul style="list-style-type: none"> • Relevance and Outcomes: The applicant should provide a detailed description of the technology, including the scientific and other principles and objectives that will be pursued during the project. This section should describe the relevance of the proposed project to the goals and objectives of the FOA, including the potential to meet specific DOE technical targets or other relevant performance targets. The applicant should clearly specify the expected outcomes of the project. • Feasibility: The applicant should demonstrate the technical feasibility of the proposed technology and capability of achieving the anticipated performance targets, including a description of previous work done and prior results. • Innovation and Impacts: The applicant should describe the current state of the art in the applicable field, the specific innovation of the proposed technology, the advantages of proposed technology over current and emerging technologies, and the overall impact on advancing the state of the art/technical baseline if the project is successful.
<p>Workplan and Market Transformation Plan (This section should constitute approximately 40% of the Technical Volume)</p>	<p>The Workplan should include a summary of the Project Objectives, Technical Scope, Work Breakdown Structure, Milestones, Go/No-Go Decision Points, and Project Schedule. A detailed Statement of Project Objectives (SOPO) is separately requested. The Workplan should contain the following information:</p> <ul style="list-style-type: none"> • Project Objectives: The applicant should provide a clear and concise (high-level) statement of the goals and objectives of the project as well as the expected outcomes. • Technical Scope Summary: The applicant should provide a summary description of the overall work scope and approach to achieve the objective(s). The overall work scope is to be divided by performance periods that are separated by discrete, approximately annual decision points (see below for more information on go/no-go decision points). The applicant should

	<p>describe the specific expected end result of each performance period.</p> <ul style="list-style-type: none"> • Work Breakdown Structure (WBS) and Task Description Summary: The Workplan should describe the work to be accomplished and how the applicant will achieve the milestones, will accomplish the final project goal(s), and will produce all deliverables. The Workplan is to be structured with a hierarchy of performance period (approximately annual), task and subtasks, which is typical of a standard work breakdown structure (WBS) for any project. The Workplan shall contain a concise description of the specific activities to be conducted over the life of the project. The description shall be a full explanation and disclosure of the project being proposed (i.e., a statement such as “we will then complete a proprietary process” is unacceptable). It is the applicant’s responsibility to prepare an adequately detailed task plan to describe the proposed project and the plan for addressing the objectives of this FOA. The summary provided should be consistent with the SOPO. The SOPO will contain a more detailed description of the WBS and tasks. • Milestone Summary: The applicant should provide a summary of appropriate milestones throughout the project to demonstrate success. A milestone may be either a progress measure (which can be activity based) or a SMART technical milestone. SMART milestones should be Specific, Measurable, Achievable, Relevant, and Timely, and must demonstrate a technical achievement rather than simply completing a task. Unless otherwise specified in the FOA, the minimum requirement is that each project must have at least one milestone per quarter for the duration of the project with at least one SMART technical milestone per year (depending on the project, more milestones may be necessary to comprehensively demonstrate progress). The applicant should also provide the means by which the milestone will be verified. The summary provided should be consistent with the Milestone Summary Table in the SOPO. • Go/No-Go Decision Points: The applicant should provide a summary of project-wide go/no-go decision points at appropriate points in the Workplan. A go/no-go decision point is a risk management tool and a project management best practice to ensure that, for the current phase or period of performance, technical success is definitively achieved and potential for success in future phases or periods of performance is evaluated, prior to actually beginning the execution of future phases. Unless otherwise specified in the FOA, the minimum requirement is that each project must have at least one project-wide go/no-go decision point for each budget period (12 to 18-month period) of the project. The Applicant should also provide the specific technical criteria to be used to make the go/no-go decision. The summary provided should be consistent with the SOPO. Go/no-go decision points are considered “SMART” and can fulfill the requirement for an annual SMART milestone.
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	<ul style="list-style-type: none"> • End of Project Goal: The applicant should provide a summary of the end of project goal(s). Unless otherwise specified in the FOA, the minimum requirement is that each project must have one SMART end of project goal. The summary provided should be consistent with the SOPO. • Project Schedule (Gantt chart or similar): The applicant should provide a schedule for the entire project, including task and subtask durations, milestones, and go/no-go decision points. • Project Management: The applicant should discuss the team's proposed management plan, including the following: <ul style="list-style-type: none"> ○ The overall approach to and organization for managing the work ○ The roles of each Project Team member ○ Any critical handoffs/interdependencies among Project Team members ○ The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices ○ The approach to project risk management ○ A description of how project changes will be handled ○ If applicable, the approach to Quality Assurance/Control ○ How communications will be maintained among Project Team members • Market Transformation Plan: The applicant should provide a market transformation plan, including the following: <ul style="list-style-type: none"> ○ Identification of target market, competitors, and distribution channels for proposed technology along with known or perceived barriers to market penetration, including a mitigation plan ○ Identification of a product development and/or service plan, commercialization timeline, financing, product marketing, legal/regulatory considerations including intellectual property, infrastructure requirements, data dissemination, U.S. manufacturing plan etc., and product distribution.
Technical Qualifications and Resources (Approximately 20% of the Technical Volume)	<p>The Technical Qualifications and Resources should contain the following information:</p> <ul style="list-style-type: none"> • Describe the Project Team's unique qualifications and expertise, including those of key Subrecipients. • Describe the Project Team's existing equipment and facilities that will facilitate the successful completion of the proposed project; include a justification of any new equipment or facilities requested as part of the project. • This section should also include relevant, previous work efforts, demonstrated innovations, and how these enable the applicant to achieve the project objectives.

	<ul style="list-style-type: none"> • Describe the time commitment of the key team members to support the project. • Attach one-page resumes for key participating team members as an appendix. Resumes do not count towards the page limit. Multi-page resumes are not allowed. • Describe the technical services to be provided by DOE/NNSA FFRDCs, if applicable. • For multi-organizational or multi-investigator projects, describe succinctly: <ul style="list-style-type: none"> ○ The roles and the work to be performed by each PI and Key Participant; ○ Business agreements between the applicant and each PI and Key Participant; ○ How the various efforts will be integrated and managed; ○ Process for making decisions on scientific/technical direction; ○ Publication arrangements; ○ Intellectual Property issues; and ○ Communication plans
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Technical Volume content for AOI 2 “Integrated Computational Materials Engineering Predictive Tools for Low-Cost Carbon Fiber”

SECTION/PAGE LIMIT	DESCRIPTION
Cover Page	The cover page should include the project title, the specific FOA Area of Interest being addressed (if applicable), both the technical and business points of contact, names of all team member organizations, and any statements regarding confidentiality.
Project Overview (This section should constitute approximately 10% of the Technical Volume)	<p>The Project Overview should contain the following information:</p> <ul style="list-style-type: none"> • Background: The applicant should discuss the background of their organization, including the history, successes, and current research and development status (i.e., the technical baseline) relevant to the technical topic being addressed in the Full Application. • Project Goal: The applicant should explicitly identify the targeted improvements to the baseline technology and the critical success factors in achieving that goal. • DOE Impact: The applicant should discuss the impact that DOE funding would have on the proposed project. Applicants should specifically explain how DOE funding, relative to prior, current, or anticipated funding from other public and private sources, is necessary to achieve the project objectives.

<p>Technical Description, Innovation, and Impact (This section should constitute approximately 40% of the Technical Volume)</p>	<p>The Technical Description should contain the following information:</p> <ul style="list-style-type: none"> • Relevance and Outcomes: The applicant should provide a detailed description of the technology, including the scientific and other principles and objectives that will be pursued during the project. • Describe the relevance of the proposed project to the goals and objectives of the Vehicle Technologies Office. Provide evidence that this project is not represented in a significant way in the VTO's existing Technology Roadmaps, current project portfolios, or solicitations.. • Feasibility: The applicant should demonstrate the technical feasibility of the proposed technology and capability of achieving the anticipated performance targets, including a description of previous work done and prior results. • Innovation and Impacts: The applicant should describe the current state of the art in the applicable field, the specific innovation of the proposed technology, the advantages of proposed technology over current and emerging technologies, and the overall impact on advancing the state of the art/technical baseline if the project is successful.
<p>Workplan (This section should constitute approximately 30% of the Technical Volume)</p>	<p>The Workplan should include a summary of the Project Objectives, Technical Scope, Work Breakdown Structure, Milestones, Go/No-Go Decision Points, and Project Schedule. A detailed Statement of Project Objectives (SOPO) is separately requested. The Workplan should contain the following information:</p> <ul style="list-style-type: none"> • Project Objectives: The applicant should provide a clear and concise (high-level) statement of the goals and objectives of the project as well as the expected outcomes. • Technical Scope Summary: The applicant should provide a summary description of the overall work scope and approach to achieve the objective(s). The overall work scope is to be divided by performance periods that are separated by discrete, approximately annual decision points (see below for more information on go/no-go decision points). The applicant should describe the specific expected end result of each performance period. • Work Breakdown Structure (WBS) and Task Description Summary: The Workplan should describe the work to be accomplished and how the applicant will achieve the milestones, will accomplish the final project goal(s), and will produce all deliverables. The Workplan is to be structured with a hierarchy of performance period (approximately annual), task and subtasks, which is typical of a standard work breakdown structure (WBS) for any project. The Workplan shall contain a concise description of the specific activities to be conducted over the life of the project. The description shall be a full explanation and disclosure of the project being proposed (i.e., a statement such as "we will then complete a proprietary process" is unacceptable). It is the applicant's responsibility to prepare an adequately detailed task plan to

	<p>describe the proposed project and the plan for addressing the objectives of this FOA. The summary provided should be consistent with the SOPO. The SOPO will contain a more detailed description of the WBS and tasks.</p> <ul style="list-style-type: none"> • Milestone Summary: The applicant should provide a summary of appropriate milestones throughout the project to demonstrate success, where success is defined as technical achievement rather than simply completing a task. To ensure that milestones are relevant, applicants should follow the SMART rule of thumb, which is that all milestones should be Specific, Measurable, Achievable, Relevant, and Timely. Unless otherwise specified in the FOA, the minimum requirement is that each project must have at least one milestone per quarter for the duration of the project (depending on the project, more milestones may be necessary to comprehensively demonstrate progress). The applicant should also provide the means by which the milestone will be verified. The summary provided should be consistent with the Milestone Summary Table in the SOPO. • Go/No-Go Decision Points: The applicant should provide a summary of project-wide go/no-go decision points at appropriate points in the Workplan. A go/no-go decision point is a risk management tool and a project management best practice to ensure that, for the current phase or period of performance, technical success is definitively achieved and potential for success in future phases or periods of performance is evaluated, prior to actually beginning the execution of future phases. Unless otherwise specified in the FOA, the minimum requirement is that each project must have at least one project-wide go/no-go decision point for each budget period (12 to 18-month period) of the project. The Applicant should also provide the specific technical criteria to be used to make the go/no-go decision. The summary provided should be consistent with the SOPO. • Project Schedule (Gantt chart or similar): The applicant should provide a schedule for the entire project, including task and subtask durations, milestones, and go/no-go decision points. • Project Management: The applicant should discuss the team's proposed management plan, including the following: <ul style="list-style-type: none"> ○ The overall approach to and organization for managing the work ○ The roles of each Project Team member ○ Any critical handoffs/interdependencies among Project Team members ○ The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices ○ The approach to project risk management ○ A description of how project changes will be handled
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	<ul style="list-style-type: none"> ○ If applicable, the approach to Quality Assurance/Control ○ How communications will be maintained among Project Team members
Technical Qualifications and Resources (Approximately 20% of the Technical Volume)	<p>The Technical Qualifications and Resources should contain the following information:</p> <ul style="list-style-type: none"> • Describe the Project Team’s unique qualifications and expertise, including those of key Subrecipients. • Describe the Project Team’s existing equipment and facilities that will facilitate the successful completion of the proposed project; include a justification of any new equipment or facilities requested as part of the project. • This section should also include relevant, previous work efforts, demonstrated innovations, and how these enable the applicant to achieve the project objectives. • Describe the time commitment of the key team members to support the project. • Attach one-page resumes for key participating team members as an appendix. Resumes do not count towards the page limit. Multi-page resumes are not allowed. • Describe the technical services to be provided by DOE/NNSA FFRDCs, if applicable. • For multi-organizational or multi-investigator projects, describe succinctly: <ul style="list-style-type: none"> ○ The roles and the work to be performed by each PI and Key Participant; ○ Business agreements between the applicant and each PI and Key Participant; ○ How the various efforts will be integrated and managed; ○ Process for making decisions on scientific/technical direction; ○ Publication arrangements; ○ Intellectual Property issues; and ○ Communication plans

Example Milestone Summary Table

Milestone Summary Table							
Recipient Name:							
Project Title:							
Task Number	Task Title or Subtask Title (If Applicable)	Milestone Type (Milestone or Go/No-Go)	Milestone Number* (Go/No-Go Decision)	Milestone Description (Go/No-Go Decision Criteria)	Milestone Verification Process (What, How, Who, Where)	Anticipated Date (Months from Start of the Project)	Anticipated Quarter (Quarters from Start of the Project)

		Decision Point)	Point Number)				

**Milestone numbering convention should align with Task and Subtask numbers, as appropriate. For example, M1.1, M3.2, etc.*

Note 1: It is required that each project has at least one milestone per quarter for the entire project duration. It is not necessary that each task have one milestone per quarter.

Note 2: It is required that each project has at least one project-wide go/no-go decision point each year. If a decision point is not specific to a particular task, then you may leave the task information blank for those decision points.

Note 3: All milestones should follow the SMART rule of thumb: Specific, Measureable, Achievable, Relevant, and Timely

Example Work Breakdown Structure

Technical Summary: Provide a high-level overview of the final result of this project. Explain the final objective, outcome, milestone and/or deliverable that are to be produced and the rationale for why the applicant has organized the tasks in the way they have.

Technical Details (Optional): Describe the relevant management, engineering, design, process, scientific or other principles and aspects of the project that warrant discussion.

Task 1: Distinctive Title, Date range of the task in months (M1-M4)

Task Summary: Task summaries shall explicitly describe what work is to be accomplished, identify the project objectives/outcomes being addressed and provide a concise statement of the objectives of that task. In addition, the description should indicate the project deliverables that this task will help achieve (D1, D2, D5 etc. note that deliverables may be applicable to multiple or all tasks.)

Task Details: Within this section, the barriers and risks should be identified, as well as the approaches for overcoming those barriers and risks. Where appropriate, multiple pathways early in the effort can be outlined for risk reduction.

Milestone 1.1 (if applicable)

Milestone 1.2 (if applicable)

Etc.

Subtask 1.1: Date range (M1-M2)

Subtask Summary: Describe the specific and detailed work efforts that go into achieving the higher-level tasks.

Subtask Details: Describe the evaluation techniques that will be used and the expected result that will be generated from the effort.

Milestone 1.1.1 (if applicable)

Milestone 1.1.2 (if applicable)

Etc.

Subtask 1.2:

(Continue until all Task 1 subtasks are listed)

Task 2: (continue in the format above until all tasks and subtasks are listed)

Subtask 2.1: Description and Discussion

Subtask 2.2: Description and Discussion

iii. Statement of Project Objectives

Applicants are required to complete a Statement of Project Objectives (SOPO). A SOPO template is available on EERE Exchange at <https://eere-Exchange.energy.gov/>. The SOPO, including the Milestone Table, must not exceed 10 pages when printed using standard 8.5 x 11 paper with 1" margins (top, bottom, left, and right) with font not smaller than 12 point. Save the SOPO in a single Microsoft Word file using the following convention for the title "ControlNumber_LeadOrganization_SOPO".

iv. SF-424: Application for Federal Assistance

Complete all required fields in accordance with the instructions on the form. The list of certifications and assurances in Field 21 can be found at <http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms>, under Certifications and Assurances. Note: The dates and dollar amounts on the SF-424 are for the complete project period and not just the first project year, first phase or other subset of the project period. Save the SF-424 in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_App424".

v. Budget Justification Workbook (EERE 335)

Applicants are required to complete the Budget Justification Workbook. This form is available on EERE Exchange at <https://eere-Exchange.energy.gov/>.

Prime Recipients must complete each tab of the Budget Justification Workbook for the project as a whole, including all work to be performed by the Prime Recipient and its Subrecipients and Contractors, and provide all requested documentation (e.g., a Federally-approved rate agreement, vendor quotes). Applicants should include costs associated with required annual audits and incurred cost proposals in their proposed budget documents. The “Instructions and Summary” included with the Budget Justification Workbook will auto-populate as the applicant enters information into the Workbook. Applicants must carefully read the “Instructions and Summary” tab provided within the Budget Justification Workbook. Save the Budget Justification Workbook in a single Microsoft Excel file using the following convention for the title “ControlNumber_LeadOrganization_Budget_Justification”.

vi. Summary/Abstract for Public Release

Applicants are required to submit a one-page summary/abstract of their project. The project summary/abstract must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained document that identifies the name of the applicant, the project director/principal investigator(s), the project title, the objectives of the project, a description of the project, including methods to be employed, the potential impact of the project (e.g., benefits, outcomes), and major participants (for collaborative projects). This document must not include any proprietary or sensitive business information as DOE may make it available to the public after selections are made. The project summary must not exceed 1 page when printed using standard 8.5 x 11 paper with 1” margins (top, bottom, left, and right) with font not smaller than 12 point. Save the Summary for Public Release in a single PDF file using the following convention for the title “ControlNumber_LeadOrganization_Summary”.

vii. Summary Slide

Applicants are required to provide a single PowerPoint slide summarizing the proposed project. The slide must be submitted in Microsoft PowerPoint format. This slide is used during the evaluation process. Save the Summary Slide in a single file using the following convention for the title “ControlNumber_LeadOrganization_Slide”.

The Summary Slide template requires the following information:

- A technology Summary;
- A description of the technology’s impact;
- Proposed project goals;
- Any key graphics (illustrations, charts and/or tables);
- The project’s key idea/takeaway;

- Project title, Prime Recipient, Principal Investigator, and Key Participant information; and
- Requested EERE funds and proposed applicant cost share.

viii. Subaward Budget Justification (EERE 335) (if applicable)

Applicants must provide a separate budget justification, EERE 335 (i.e., budget justification for each budget year and a cumulative budget) for each subawardee that is expected to perform work estimated to be more than \$100,000 or 25% of the total work effort (whichever is less). The budget justification must include the same justification information described in the “Budget Justification” section above. Save each subaward budget justification in a Microsoft Excel file using the following convention for the title “ControlNumber_LeadOrganization_Subawardee_Budget_Justification”.

ix. Budget for DOE/NNSA FFRDC (if applicable)

If a DOE/NNSA FFRDC contractor is to perform a portion of the work, the applicant must provide a DOE Field Work Proposal (FWP) in accordance with the requirements in DOE Order 412.1, Work Authorization System. DOE Order 412.1 and DOE O 412.1 (Field Work Proposal form) are available at the following link, under “DOE Budget Forms”:

<https://www.directives.doe.gov/directives/0412.1-BOrder-a/view>. Save the FWP in a single PDF file using the following convention for the title “ControlNumber_LeadOrganization_FWP”.

x. Authorization for non-DOE/NNSA or DOE/NNSA FFRDCs (if applicable)

The Federal agency sponsoring the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The use of a FFRDC must be consistent with the contractor’s authority under its award. Save the Authorization in a single PDF file using the following convention for the title “ControlNumber_LeadOrganization_FFRDCAuth”.

xi. SF-LLL: Disclosure of Lobbying Activities

Prime Recipients and Subrecipients may not use any Federal funds to influence or attempt to influence, directly or indirectly, congressional action on any legislative or appropriation matters.

Prime Recipients and Subrecipients are required to complete and submit SF-LLL, “Disclosure of Lobbying Activities”

(<http://www.whitehouse.gov/sites/default/files/omb/grants/sfillin.pdf>) if any non-Federal funds have been paid or will be paid to any person for influencing or attempting to influence any of the following in connection with your application:

- An officer or employee of any Federal agency;

- A Member of Congress;
- An officer or employee of Congress; or
- An employee of a Member of Congress.

Save the SF-LLL in a single PDF file using the following convention for the title “ControlNumber_LeadOrganization_SF-LLL”.

xii. Waiver Request: Performance of Work in the United States (if applicable)

a. Performance of Work in the United States

As set forth in Section IV.K.iii, all work under EERE funding agreements must be performed in the United States. This requirement does not apply to the purchase of supplies and equipment, so a waiver is not required for foreign purchases of these items. However, the Prime Recipient should make every effort to purchase supplies and equipment within the United States. Appendix C lists the necessary information that must be included in a request to waive the Performance of Work in the United States requirement.

xiii. U.S. Manufacturing Commitments

As part of the application, applicants **are required to submit a U.S. Manufacturing Plan when applying to Areas of Interest 1, 3, and 4.** Applicants to all other Areas of Interest are not required to submit as U.S. Manufacturing Plan.

The U.S. Manufacturing Plan represents the applicant’s measurable commitment to support U.S. manufacturing as a result of its award.

The weight given to the U.S. Manufacturing Plans during the review and selection process varies based on the particular FOA. Applicants should review Section V.A.2 of this FOA to determine the weight given to the U.S. Manufacturing Plans under this FOA.

A U.S. Manufacturing Plan should contain the following or similar preamble: “If selected for funding, the applicant agrees to the following commitments as a condition of that funding:” and, after the preamble, the plan should include one or more specific and measureable commitments. For example, an applicant may commit particular types of products to be manufactured in the U.S. In addition to or instead of making a commitment tied to a particular product, the applicant may make other types of commitments still beneficial to U.S. manufacturing. An applicant may commit to a particular investment in a new or existing U.S. manufacturing facility, keep certain activities based in the U.S. (i.e., final assembly) or support a certain number of jobs in the U.S. related to the technology and manufacturing. For an

applicant which is likely to license the technology to others, especially universities for which licensing may be the exclusive means of commercialization the technology, the U.S. manufacturing plan may indicate the applicant's plan and commitment to use a licensing strategy that would likely support U.S. manufacturing.

When an applicant that is a domestic small business, domestic educational institution, or nonprofit organization is selected for an award, the U.S. Manufacturing Plan submitted by the applicant becomes part of the terms and conditions of the award. The applicant/awardee may request a waiver or modification of the U.S. Manufacturing Plan from DOE upon a showing that the original U.S. Manufacturing Plan is no longer economically feasible.

When an applicant that is a domestic large business is selected for an award, a class patent waiver applies as set forth in Section VIII. L. Under this class patent waiver, domestic large businesses may elect title to their subject inventions similar to the right provided to the domestic small businesses, educational institutions, and nonprofits by law. In order to avail itself of the class patent waiver, a domestic large business must agree that any products embodying or produced through the use of an invention conceived or first actually reduced to practice under the award will be substantially manufactured in the United States, unless DOE agrees that the commitments proposed in the U.S. Manufacturing Plan are sufficient.

For other entity types that are selected for award, please see Section VIII.L regarding U.S. manufacturing commitments.

xiv. Data Management Plan

Applicants whose Full Applications are selected for award negotiations will be required to submit a Data Management Plan during the award negotiations phase. The Data Management Plan is a document that outlines the proposed plan for data sharing or preservation. Submission of this plan is required, and failure to submit the plan may result in the termination of award negotiations. As a courtesy, guidance for preparing a Data Management Plan is provided in Appendix D of the FOA.

xv. Environmental Questionnaire

You must complete the Environmental Questionnaire. This form is available on EERE Exchange at <https://eere-Exchange.energy.gov/> and can also be found at https://www.eere-pmc.energy.gov/RecipientLogin/EQ_Sample.pdf

Save the Environmental Questionnaire in a single PDF file using the following convention for the title "Control Number_LeadOrganization_EQ."

xvi. Cost Share Commitment Letters

If cost share is required, you must have a letter from each third party contributing cost share (i.e., a party other than the organization submitting the application) stating that the third party is committed to providing a specific minimum dollar amount of cost share. Identify the following information for each third party contributing cost share: (1) the name of the organization; (2) the proposed dollar amount to be provided; (3) the amount as a percentage of the total project cost; and (4) the proposed type of cost share – cash, services, or property.

Letters of Commitment from parties participating in the project, exclusive of vendors, who will not be contributing cost share, but will be integral to the success of the project. Examples include participation support letters from OEMs and Tier 1 suppliers.

Please combine each individual Letter of Commitment into a single file. Save the Letters of Commitment in a single PDF file using the following convention for the title “ControlNumber_LeadOrganization_LOC”.

E. Post-Award Information Requests

Data Management Plan

Within 30 days of notification of selection, the applicant will be required to submit a Data Management Plan. The Data Management Plan is a document that outlines the proposed plan for data sharing and/or preservation. Failure to submit a complete Data Management Plan may result in termination of negotiations. Guidance for preparing a Data Management Plan is included in Appendix D of the FOA.

If selected for award, EERE reserves the right to request additional or clarifying information for any reason deemed necessary, including but not limited to:

- Indirect cost information;
- Other budget information;
- Commitment Letters from Third Parties Contributing to Cost Share, if applicable;
- Name and phone number of the Designated Responsible Employee for complying with national policies prohibiting discrimination (See 10 CFR 1040.5);
- Representation of Limited Rights Data and Restricted Software, if applicable;
- Updated Environmental Questionnaire; and
- Foreign National Involvement.

F. Dun and Bradstreet Universal Numbering System Number and System for Award Management

Each applicant (unless the applicant is an individual or Federal awarding agency that is excepted from those requirements under 2 CFR §25.110(b) or (c), or has an exception approved by the Federal awarding agency under 2 CFR §25.110(d)) is required to: (1) Be registered in the System for Award Management (SAM) at <https://www.sam.gov> before submitting its application; (2) provide a valid Dun and Bradstreet Universal Numbering System (DUNS) number in its application; and (3) continue to maintain an active SAM registration with current information at all times during which it has an active Federal award or an application or plan under consideration by a Federal awarding agency. DOE may not make a Federal award to an applicant until the applicant has complied with all applicable DUNS and SAM requirements and, if an applicant has not fully complied with the requirements by the time DOE is ready to make a Federal award, the DOE may determine that the applicant is not qualified to receive a Federal award and use that determination as a basis for making a Federal award to another applicant.

G. Submission Dates and Times

Concept Papers and Full Applications must be submitted in EERE Exchange no later than 5 p.m. Eastern on the dates provided on the cover page of this FOA.

H. Intergovernmental Review

This FOA is not subject to Executive Order 12372 – Intergovernmental Review of Federal Programs.

I. Funding Restrictions

i. Allowable Costs

All expenditures must be allowable, allocable, and reasonable in accordance with the applicable Federal cost principles.

Refer to the following applicable Federal cost principles for more information:

- FAR Part 31 for For-Profit entities; and
- 2 CFR Part 200 Subpart E - Cost Principles for all other non-federal entities.

ii. Pre-Award Costs

Selectees must request prior written approval to charge pre-award costs. Pre-award costs are those incurred prior to the effective date of the Federal award directly pursuant to the negotiation and in anticipation of the Federal award where such costs are necessary for efficient and timely performance

of the scope of work. Such costs are allowable only to the extent that they would have been allowable if incurred after the date of the Federal award and **only** with the written approval of the Federal awarding agency, through the Contracting Officer assigned to the award.

Pre-award costs cannot be incurred prior to the Selection Official signing the Selection Statement and Analysis. Pre-award costs can only be incurred if such costs would be reimbursable under the agreement if incurred after award.

Pre-Award expenditures are made at the Selectee's risk; EERE is not obligated to reimburse costs: (1) in the absence of appropriations; (2) if an award is not made; or (3) if an award is made for a lesser amount than the Selectee anticipated.

a. Pre-Award Costs Related to National Environmental Policy Act (NEPA) Requirements

EERE's decision whether and how to distribute Federal funds under this FOA is subject to NEPA. Applicants should carefully consider and should seek legal counsel or other expert advice before taking any action related to the proposed project that would have an adverse effect on the environment or limit the choice of reasonable alternatives prior to EERE completing the NEPA review process.

EERE does not guarantee or assume any obligation to reimburse costs where the Prime Recipient incurred the costs prior to receiving written authorization from the Contracting Officer. If the applicant elects to undertake activities that may have an adverse effect on the environment or limit the choice of reasonable alternatives prior to receiving such written authorization from the Contracting Officer, the applicant is doing so at risk of not receiving Federal funding and such costs may not be recognized as allowable cost share. Likewise, if a project is selected for negotiation of award, and the Prime Recipient elects to undertake activities that are not authorized for Federal funding by the Contracting Officer in advance of EERE completing a NEPA review, the Prime Recipient is doing so at risk of not receiving Federal Funding and such costs may not be recognized as allowable cost share. Nothing contained in the pre-award cost reimbursement regulations or any pre-award costs approval letter from the Contracting Officer override these NEPA requirements to obtain the written authorization from the Contracting Officer prior to taking any action that may have an adverse effect on the environment or limit the choice of reasonable alternatives.

iii. Performance of Work in the United States

a. Requirement

All work performed under EERE Awards must be performed in the United States (100% of all direct labor, including contract/subrecipient labor). This requirement does not apply to the purchase of supplies and equipment; however, the Prime Recipient should make every effort to purchase supplies and equipment within the United States. The Prime Recipient must flow down this requirement to its Subrecipients.

b. Failure to Comply

If the Prime Recipient fails to comply with the Performance of Work in the United States requirement, EERE may deny reimbursement for the work conducted outside the United States and such costs may not be recognized as allowable recipient cost share. The Prime Recipient is responsible should any work under this Award be performed outside the United States, absent a waiver, regardless of if the work is performed by the Prime Recipient, Subrecipients, contractors or other project partners.

c. Waiver

There may be limited circumstances where it is in the interest of the project to perform a portion of the work outside the United States. To seek a waiver of the Performance of Work in the United States requirement, the applicant must submit a written waiver request to EERE. Appendix C lists the necessary information that must be included in a request to waive the Performance of Work in the United States requirement.

The applicant must demonstrate to the satisfaction of EERE that a waiver would further the purposes of the FOA and is in the economic interests of the United States. EERE may require additional information before considering a waiver request. Save the waiver request(s) in a single PDF file titled "ControlNumber_PerformanceofWork_Waiver". The applicant does not have the right to appeal EERE's decision concerning a waiver request.

iv. Construction

Recipients are required to obtain written authorization from the Contracting Officer before incurring any major construction costs.

v. Foreign Travel

If international travel is proposed for your project, please note that your organization must comply with the International Air Transportation Fair Competitive Practices Act of 1974 (49 USC 40118), commonly referred to as the “Fly America Act,” and implementing regulations at 41 CFR 301-10.131 through 301-10.143. The law and regulations require air transport of people or property to, from, between, or within a country other than the United States, the cost of which is supported under this award, to be performed by or under a cost-sharing arrangement with a U.S. flag carrier, if service is available. Foreign travel costs are allowable only with the written prior approval of the Contracting Officer assigned to the award.

vi. Equipment and Supplies

To the greatest extent practicable, all equipment and products purchased with funds made available under this FOA should be American-made. This requirement does not apply to used or leased equipment.

Property disposition will be required at the end of a project if the current fair market value of property exceeds \$5,000. The rules for property disposition are set forth in 2 CFR 200.310 – 200.316 as amended by 2 CFR 910.360.

vii. Lobbying

Recipients and Subrecipients may not use any Federal funds to influence or attempt to influence, directly or indirectly, congressional action on any legislative or appropriation matters.

Recipients and Subrecipients are required to complete and submit SF-LLL, “Disclosure of Lobbying Activities”

(<http://www.whitehouse.gov/sites/default/files/omb/grants/sfillin.pdf>) if any non-Federal funds have been paid or will be paid to any person for influencing or attempting to influence any of the following in connection with your application:

- An officer or employee of any Federal agency;
- A Member of Congress;
- An officer or employee of Congress; or
- An employee of a Member of Congress.

viii. Risk Assessment

Prior to making a Federal award, the DOE is required by 31 U.S.C. 3321 and 41 U.S.C. 2313 to review information available through any OMB-designated repositories of government-wide eligibility qualification or financial integrity information, such as SAM Exclusions and “Do Not Pay.”

In addition, DOE evaluates the risk(s) posed by applicants before they receive Federal awards. This evaluation may consider: results of the evaluation of the applicant's eligibility; the quality of the application; financial stability; quality of management systems and ability to meet the management standards prescribed in this part; history of performance; reports and findings from audits; and the applicant's ability to effectively implement statutory, regulatory, or other requirements imposed on non-Federal entities.

In addition to this review, DOE must comply with the guidelines on government-wide suspension and debarment in 2 CFR 180, and must require non-Federal entities to comply with these provisions. These provisions restrict Federal awards, subawards and contracts with certain parties that are debarred, suspended or otherwise excluded from or ineligible for participation in Federal programs or activities.

ix. Invoice Review and Approval

DOE employs a risk-based approach to determine the level of supporting documentation required for approving invoice payments. Recipients may be required to provide some or all of the following items with their requests for reimbursement:

- Summary of costs by cost categories;
- Timesheets or personnel hours report;
- Invoices/receipts for all travel, equipment, supplies, contractual, and other costs;
- UCC filing proof for equipment acquired with project funds by for-profit recipients and subrecipients;
- Explanation of cost share for invoicing period;
- Analogous information for some subrecipients; and
- Other items as required by DOE.

V. Application Review Information

A. Technical Review Criteria

i. Concept Papers

Concept Papers are evaluated based on consideration the following factors. All sub-criteria are of equal weight.

Concept Paper Criterion:

Weight: 100%

Overall FOA Responsiveness and Viability of the Project.

This criterion involves consideration of the following factors:

- The applicant clearly describes the proposed technology, describes how the technology is unique and innovative, and how the technology will advance the current state-of-the-art;
- The applicant has identified risks and challenges, including possible mitigation strategies, and has shown the impact that EERE funding and the proposed project would have on the relevant field and application;
- The applicant has the qualifications, experience, capabilities and other resources necessary to complete the proposed project; and
- The proposed work, if successfully accomplished, would clearly meet the objectives as stated in the FOA.

ii. Full Applications

Applications will be evaluated against the merit review criteria shown below. All sub-criteria are of equal weight.

Full Application Technical Review Criteria for Areas of Interest 1, 3, and 4

Criterion 1: Technical Merit, Innovation, and Impact (45%)

- Extent to which the application demonstrates knowledge of the current state-of-the-art (SOA) or baseline technology;
- Extent to which the proposed innovative technology is consistent with the objectives and achievement of prescribed goals, targets, or metrics as described in the area of interest; and
- Extent to which the proposed project is technically sound, technically viable, and includes relevant data, calculations, technical assumptions, design rationale, alternatives, discussion of prior work, and literature.

Criterion 2: Project Research and Market Transformation Plan (40%)

- Extent to which the tasks and task descriptions are comprehensive, appropriate, detailed, and unambiguous in explaining how project goals will be met;
- Extent to which the approach comprehensively and logically addresses research, development, validation, demonstration activities, risks, and risk mitigation strategies;

- Extent to which the project schedule represents a realistic and comprehensive plan for the project and provides the critical path for project completion;
- Degree to which the test plan addresses key and relevant operational and performance evaluations for the proposed project, including details such as proposed test matrices, modeling and simulation, data acquisition, and sampling and analysis protocols;
- Extent of the comprehensiveness, appropriateness, and clarity of the quantifiable project metrics, milestones, interim deliverables, and Go/No Go Decision Points;
- Extent to which the Market Transformation/Commercialization Plan demonstrates capability to impact domestic fleet efficiency, which is demonstrated by the following:
 - Knowledge of the target market(s), distribution channels, and competitors as well as the risks and risk mitigation strategies associated with each;
 - Extent to which the Applicant addresses infrastructure requirements, and presents a viable plan for infrastructure development to manufacture the technology; and
- Comprehensiveness and reasonableness of the Market Transformation/Commercialization Plan and extent to which items such as the following items are addressed:
 - economic viability of the proposed technology;
 - the commercialization timeline;
 - alternatives;
 - distribution;
 - infrastructure requirements;
 - U.S. Manufacturing Plan;
 - licensing; and
 - legal/regulatory considerations such as intellectual property.

Criterion 3: Team and Resources (15%)

- Extent to which the application demonstrates that the proposed team and individuals have the capabilities, qualifications and proven experience to comprehensively address all aspects of the proposed project as well as further development and commercial deployment of the proposed technologies;
- Degree to which the proposed consortia/team demonstrates the ability to facilitate and expedite further development and commercial deployment of the proposed technologies;
- Sufficiency of the proposed equipment and facilities to support all aspects of the proposed project; and

- Level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the workplan.

Full Application Technical Review Criteria for Area of Interest 2.

Criterion 1: Technical Merit and Innovation (Weight 45%)

- Extent to which the application demonstrates knowledge of the current state-of-the-art (SOA) or baseline technology;
- Extent to which the proposed innovative technology is consistent with the objectives and achievement of prescribed goals, targets, or metrics as described in the area of interest; and
- Extent to which the proposed project is technically sound, technically viable, and includes where applicable relevant data, calculations, technical assumptions, design rationale, alternatives, discussion of prior work, and literature.

Criterion 2: Project Approach (Weight 40%)

- Extent to which the tasks and task descriptions are comprehensive, appropriate, detailed, and unambiguous in explaining how project goals will be met;
- Extent to which the approach comprehensively and logically addresses research activities, risks, and risk mitigation strategies;
- Extent to which the project schedule represents a realistic and comprehensive plan for the project and provides the critical path for project completion;
- Degree to which the project appropriately addresses key and relevant operational and performance evaluations, including where applicable details such as proposed test matrices, modeling and simulation, validation, data acquisition, and sampling and analysis protocols; and
- Extent of the comprehensiveness, appropriateness, and clarity of the quantifiable project metrics, milestones, and Go/No Go Decision Points.

Criterion 3: Team and Resources (Weight 15%)

- Extent to which the application demonstrates that the proposed team and individuals have the capabilities, qualifications and proven experience to comprehensively address all aspects of the proposed project as well as further development and commercial deployment of the proposed technologies;

- Degree to which the proposed consortia/team demonstrates the ability to facilitate and expedite further development and commercial deployment of the proposed technologies;
- Sufficiency of the proposed equipment and facilities to support all aspects of the proposed project; and
- Level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the workplan.

B. Standards for Application Evaluation

Applications that are determined to be eligible will be evaluated in accordance with this FOA, by the standards set forth in EERE's Notice of Objective Merit Review Procedure (76 Fed. Reg. 17846, March 31, 2011) and the guidance provided in the "Department of Energy Merit Review Guide for Financial Assistance," which is available at: <http://energy.gov/management/downloads/merit-review-guide-financial-assistance>.

C. Other Selection Factors

i. Program Policy Factors

In addition to the above criteria, the Selection Official may consider the following program policy factors in determining which Full Applications to select for award negotiations:

- The proposed project, including proposed cost shares, optimizes the use of available EERE funding to achieve programmatic objectives;
- Industry involvement and demonstrated ability to commercialize energy or related technologies;
- Technical, market, organizational, and environmental risks associated with the project;
- The proposed project is likely to lead to increased employment and manufacturing in the United States;
- The proposed project will accelerate transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty;
- The proposed project collectively represents diverse types and sizes of applicant organizations while not being detrimental to the overall objectives of the program;
- The proposed project represents diverse technology concepts and applications, as well as technical approaches, while not being detrimental to the overall objectives of the program; and
- The proposed project has significant potential to impact the market while not being detrimental to the overall objectives of the program.

D. Evaluation and Selection Process

i. Overview

The evaluation process consists of multiple phases; each includes an initial eligibility review and a thorough technical review. Rigorous technical reviews of eligible submissions are conducted by reviewers that are experts in the subject matter of the FOA. Ultimately, the Selection Official considers the recommendations of the reviewers, along with other considerations such as program policy factors, in determining which applications to select.

ii. Pre-Selection Interviews

As part of the evaluation and selection process, EERE may invite one or more applicants to participate in Pre-Selection Interviews. Pre-Selection Interviews are distinct from and more formal than pre-selection clarifications (See Section V.D.3 of the FOA). The invited applicant(s) will meet with EERE representatives to provide clarification on the contents of the Full Applications and to provide EERE an opportunity to ask questions regarding the proposed project. The information provided by applicants to EERE through Pre-Selection Interviews contributes to EERE's selection decisions.

EERE will arrange to meet with the invited applicants in person at EERE's offices or a mutually agreed upon location. EERE may also arrange site visits at certain applicants' facilities. In the alternative, EERE may invite certain applicants to participate in a one-on-one conference with EERE via webinar, videoconference, or conference call.

EERE will not reimburse applicants for travel and other expenses relating to the Pre-Selection Interviews, nor will these costs be eligible for reimbursement as pre-award costs.

EERE may obtain additional information through Pre-Selection Interviews that will be used to make a final selection determination. EERE may select applications for funding and make awards without Pre-Selection Interviews. Participation in Pre-Selection Interviews with EERE does not signify that applicants have been selected for award negotiations.

iii. Pre-Selection Clarification

EERE may determine that pre-selection clarifications are necessary from one or more applicants. Pre-selection clarifications are distinct from and less formal than pre-selection interviews. These pre-selection clarifications will solely be for the purposes of clarifying the application, and will be limited to

information already provided in the application documentation. The pre-selection clarifications may occur before, during or after the merit review evaluation process. Information provided by an applicant that is not necessary to address the pre-selection clarification question will not be reviewed or considered. Typically, a pre-selection clarification will be carried out through either written responses to EERE's written clarification questions or video or conference calls with EERE representatives.

The information provided by applicants to EERE through pre-selection clarifications is incorporated in their applications and contributes to the merit review evaluation and EERE's selection decisions. If EERE contacts an applicant for pre-selection clarification purposes, it does not signify that the applicant has been selected for negotiation of award or that the applicant is among the top ranked applications.

EERE will not reimburse applicants for expenses relating to the pre-selection clarifications, nor will these costs be eligible for reimbursement as pre-award costs.

iv. Recipient Integrity and Performance Matters

DOE, prior to making a Federal award with a total amount of Federal share greater than the simplified acquisition threshold, is required to review and consider any information about the applicant that is in the designated integrity and performance system accessible through SAM (currently FAPIIS) (see 41 U.S.C. 2313).

The applicant, at its option, may review information in the designated integrity and performance systems accessible through SAM and comment on any information about itself that a Federal awarding agency previously entered and is currently in the designated integrity and performance system accessible through SAM.

DOE will consider any written comments by the applicant, in addition to the other information in the designated integrity and performance system, in making a judgment about the applicant's integrity, business ethics, and record of performance under Federal awards when completing the review of risk posed by applicants as described in 2 C.F.R. § 200.205.

v. Selection

The Selection Official may consider the technical merit, the Federal Consensus Board's recommendations, program policy factors, and the amount of funds available in arriving at selections for this FOA.

E. Anticipated Notice of Selection and Award Dates

EERE anticipates notifying applicants selected for negotiation of award by the dates listed on the first page of the FOA.

VI. Award Administration Information

A. Award Notices

i. Ineligible Submissions

Ineligible Concept Papers and Full Applications will not be further reviewed or considered for award. The Contracting Officer will send a notification letter by email to the technical and administrative points of contact designated by the applicant in EERE Exchange. The notification letter will state the basis upon which the Concept Paper or the Full Application is ineligible and not considered for further review.

ii. Concept Paper Notifications

EERE will notify applicants of its determination to encourage or discourage the submission of a Full Application. EERE will send a notification letter by email to the technical and administrative points of contact designated by the applicant in EERE Exchange.

Applicants may submit a Full Application even if they receive a notification discouraging them from doing so. By discouraging the submission of a Full Application, EERE intends to convey its lack of programmatic interest in the proposed project. Such assessments do not necessarily reflect judgments on the merits of the proposed project. The purpose of the Concept Paper phase is to save applicants the considerable time and expense of preparing a Full Application that is unlikely to be selected for award negotiations.

A notification letter encouraging the submission of a Full Application does not authorize the applicant to commence performance of the project. Please refer to Section IV.J.2 of the FOA for guidance on pre-award costs.

iii. Full Application Notifications

EERE will notify applicants of its determination via a notification letter by email to the technical and administrative points of contact designated by the applicant in EERE Exchange. The notification letter will inform the applicant whether or not its Full Application was selected for award negotiations.

*Questions about this FOA? Email DE-FOA-0001629@netl.doe.gov
Problems with EERE Exchange? Email EERE- EERE-ExchangeSupport@hq.doe.gov Include FOA name and number in subject line.*

Alternatively, EERE may notify one or more applicants that a final selection determination on particular Full Applications will be made at a later date, subject to the availability of funds or other factors.

iv. Successful Applicants

Receipt of a notification letter selecting a Full Application for award negotiations does not authorize the applicant to commence performance of the project. If an application is selected for award negotiations, it is not a commitment by EERE to issue an award. Applicants do not receive an award until award negotiations are complete and the Contracting Officer executes the funding agreement, accessible by the Prime Recipient in FedConnect.

The award negotiation process will take approximately 60 days. Applicants must designate a primary and a backup point-of-contact in EERE Exchange with whom EERE will communicate to conduct award negotiations. The applicant must be responsive during award negotiations (i.e., provide requested documentation) and meet the negotiation deadlines. If the applicant fails to do so or if award negotiations are otherwise unsuccessful, EERE will cancel the award negotiations and rescind the Selection. EERE reserves the right to terminate award negotiations at any time for any reason.

Please refer to Section IV.J.2 of the FOA for guidance on pre-award costs.

v. Alternate Selection Determinations

In some instances, an applicant may receive a notification that its application was not selected for award and EERE designated the application to be an alternate. As an alternate, EERE may consider the Full Application for Federal funding in the future. A notification letter stating the Full Application is designated as an alternate does not authorize the applicant to commence performance of the project. EERE may ultimately determine to select or not select the Full Application for award negotiations.

vi. Unsuccessful Applicants

EERE shall promptly notify in writing each applicant whose application has not been selected for award or whose application cannot be funded because of the unavailability of appropriated funds.

B. Administrative and National Policy Requirements

i. Registration Requirements

There are several one-time actions before submitting an application in response to this FOA, and it is vital that applicants address these items as soon as possible. Some may take several weeks, and failure to complete them could interfere with an applicant's ability to apply to this FOA, or to meet the negotiation deadlines and receive an award if the application is selected. These requirements are as follows:

a. EERE Exchange

Register and create an account on EERE Exchange at <https://eere-Exchange.energy.gov>. This account will then allow the user to register for any open EERE FOAs that are currently in EERE Exchange. It is recommended that each organization or business unit, whether acting as a team or a single entity, use only one account as the contact point for each submission. Applicants should also designate backup points of contact so they may be easily contacted if deemed necessary. **This step is required to apply to this FOA.**

The EERE Exchange registration does not have a delay; however, **the remaining registration requirements below could take several weeks to process and are necessary for a potential applicant to receive an award under this FOA.**

b. DUNS Number

Obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number (including the plus 4 extension, if applicable) at <http://fedgov.dnb.com/webform>.

c. System for Award Management

Register with the System for Award Management (SAM) at <https://www.sam.gov>. Designating an Electronic Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in SAM registration. Please update your SAM registration annually.

d. FedConnect

Register in FedConnect at <https://www.fedconnect.net>. To create an organization account, your organization's SAM MPIN is required. For more information about the SAM MPIN or other registration requirements, review the FedConnect Ready, Set, Go! Guide at

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<http://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect Ready Set Go.pdf>.

e. Grants.gov

Register in Grants.gov (<http://www.grants.gov>) to receive automatic updates when Amendments to this FOA are posted. However, please note that Concept Papers and Full Applications will not be accepted through Grants.gov.

f. Electronic Authorization of Applications and Award Documents

Submission of an application and supplemental information under this FOA through electronic systems used by the Department of Energy, including EERE Exchange and FedConnect.net, constitutes the authorized representative's approval and electronic signature.

ii. Award Administrative Requirements

The administrative requirements for DOE grants and cooperative agreements are contained in 2 CFR Part 200 as amended by 2 CFR Part 910.

iii. Foreign National Involvement

All applicants selected for an award resulting from this FOA may be required to provide information to the Department of Energy (DOE) in order to facilitate our responsibilities associated with foreign national access to DOE sites, information, technologies, equipment, programs or personnel. Foreign national is defined as any person who was born outside the jurisdiction of the United States, is a citizen of a foreign government, and has not been naturalized under U.S. law. If the selected applicant, including subrecipients/contractors, anticipates utilizing a foreign national in the performance of an award, the selected applicant may be responsible for providing to the DOE specific information about the foreign national(s) to ensure compliance with all of the requirements for access approval. Access approval for individuals from countries identified on the U.S. Department of State list of [State Sponsors of Terrorism](#) must receive final approval authority from the Secretary of Energy before they can commence work.

iv. Subaward and Executive Reporting

Additional administrative requirements necessary for DOE grants and cooperative agreements to comply with the Federal Funding and Transparency Act of 2006 (FFATA) are contained in 2 CFR Part 170. Prime Recipients must register with the new FFATA Subaward Reporting System database and report the required data on their first tier Subrecipients. Prime

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Recipients must report the executive compensation for their own executives as part of their registration profile in SAM.

v. National Policy Requirements

The National Policy Assurances that are incorporated as a term and condition of award are located at: <http://www.nsf.gov/awards/managing/rtc.jsp>.

vi. Environmental Review in Accordance with National Environmental Policy Act (NEPA)

EERE's decision whether and how to distribute federal funds under this FOA is subject to the National Environmental Policy Act (42 USC 4321, *et seq.*). NEPA requires Federal agencies to integrate environmental values into their decision-making processes by considering the potential environmental impacts of their proposed actions. For additional background on NEPA, please see DOE's NEPA website, at <http://nepa.energy.gov/>.

While NEPA compliance is a Federal agency responsibility and the ultimate decisions remain with the Federal agency, all recipients selected for an award will be required to assist in the timely and effective completion of the NEPA process in the manner most pertinent to their proposed project. If DOE determines certain records must be prepared to complete the NEPA review process (e.g., biological evaluations or environmental assessments), the costs to prepare the necessary records may be included as part of the project costs.

vii. Applicant Representations and Certifications

a. Lobbying Restrictions

By accepting funds under this award, the Prime Recipient agrees that none of the funds obligated on the award shall be expended, directly or indirectly, to influence Congressional action on any legislation or appropriation matters pending before Congress, other than to communicate to Members of Congress as described in 18 U.S.C. §1913. This restriction is in addition to those prescribed elsewhere in statute and regulation.

b. Corporate Felony Conviction and Federal Tax Liability Representations

In submitting an application in response to this FOA, the applicant represents that:

1. It is **not** a corporation that has been convicted of a felony criminal violation under any Federal law within the preceding 24 months, and
2. It is **not** a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

For purposes of these representations the following definitions apply:

A Corporation includes any entity that has filed articles of incorporation in any of the 50 states, the District of Columbia, or the various territories of the United States [but not foreign corporations]. It includes both for-profit and non-profit organizations.

c. Nondisclosure and Confidentiality Agreements Representations

In submitting an application in response to this FOA the applicant represents that:

1. It **does not and will not** require its employees or contractors to sign internal nondisclosure or confidentiality agreements or statements prohibiting or otherwise restricting its employees or contractors from lawfully reporting waste, fraud, or abuse to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information.
2. It **does not and will not** use any Federal funds to implement or enforce any nondisclosure and/or confidentiality policy, form, or agreement it uses unless it contains the following provisions:
 - a) *“These provisions are consistent with and do not supersede, conflict with, or otherwise alter the employee obligations, rights, or liabilities created by existing statute or Executive order relating to (1) classified information, (2) communications to Congress, (3) the reporting to an Inspector General of a violation of any law, rule, or regulation, or mismanagement, a gross waste of funds, an abuse of authority, or a substantial and specific danger to public health or*

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safety, or (4) any other whistleblower protection. The definitions, requirements, obligations, rights, sanctions, and liabilities created by controlling Executive orders and statutory provisions are incorporated into this agreement and are controlling.”

- b) The limitation above shall not contravene requirements applicable to Standard Form 312, Form 4414, or any other form issued by a Federal department or agency governing the nondisclosure of classified information.
- c) Notwithstanding the provision listed in paragraph (a), a nondisclosure or confidentiality policy form or agreement that is to be executed by a person connected with the conduct of an intelligence or intelligence-related activity, other than an employee or officer of the United States Government, may contain provisions appropriate to the particular activity for which such document is to be used. Such form or agreement shall, at a minimum, require that the person will not disclose any classified information received in the course of such activity unless specifically authorized to do so by the United States Government. Such nondisclosure or confidentiality forms shall also make it clear that they do not bar disclosures to Congress, or to an authorized official of an executive agency or the Department of Justice, that are essential to reporting a substantial violation of law.

viii. Statement of Federal Stewardship

EERE will exercise normal Federal stewardship in overseeing the project activities performed under EERE Awards. Stewardship Activities include, but are not limited to, conducting site visits; reviewing performance and financial reports, providing assistance and/or temporary intervention in usual circumstances to correct deficiencies that develop during the project; assuring compliance with terms and conditions; and reviewing technical performance after project completion to ensure that the project objectives have been accomplished.

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ix. Statement of Substantial Involvement

EERE has substantial involvement in work performed under Awards made as a result of this FOA. EERE does not limit its involvement to the administrative requirements of the Award. Instead, EERE has substantial involvement in the direction and redirection of the technical aspects of the project as a whole. Substantial involvement includes, but is not limited to, the following:

- a. EERE shares responsibility with the recipient for the management, control, direction, and performance of the Project.
- b. EERE may intervene in the conduct or performance of work under this Award for programmatic reasons. Intervention includes the interruption or modification of the conduct or performance of project activities.
- c. EERE may redirect or discontinue funding the Project based on the outcome of EERE's evaluation of the Project at that the Go/No Go decision point(s).
- d. EERE participates in major project decision-making processes.

The aforementioned substantial involvement language is anticipated by EERE for applications leading to award under this FOA. However, it may be revised during negotiations leading to award if EERE deems necessary.

x. Intellectual Property Management Plan

Within 45 days of date of award, applicants must submit an executed IP Management Plan between the members of the consortia or team.

The award will set forth the treatment of and obligations related to intellectual property rights between EERE and the individual members. The IP Management Plan should describe how the members will handle intellectual property rights and issues between themselves while ensuring compliance with Federal IP laws, regulations, and policies (see Sections VIII.L-VIII.O of this FOA for more details on applicable Federal IP laws and regulations). Guidance regarding the contents of IP Management Plans is available from EERE upon request.

The following is a non-exhaustive list of examples of items that the IP Management Plan may cover:

- The treatment of confidential information between members (i.e., the use of non-disclosure agreements);

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- The treatment of background IP (e.g., any requirements for identifying it or making it available);
- The treatment of inventions made under the project (e.g., any requirements for disclosing to the other members, filing patent applications, paying for patent prosecution, and cross-licensing or other licensing arrangements between the members);
- The treatment of data produced, including software, under the project (e.g., any publication process or other dissemination strategies, copyrighting strategy or arrangement between members);
- Any technology transfer and commercialization requirements or arrangements between the members;
- The treatment of any intellectual property issues that may arise due to a change in membership of the consortia or team; and
- The handling of disputes related to intellectual property between the members.

xi. Subject Invention Utilization Reporting

In order to ensure that Prime Recipients and Subrecipients holding title to subject inventions are taking the appropriate steps to commercialize subject inventions, EERE may require that each Prime Recipient holding title to a subject invention submit annual reports for 10 years from the date the subject invention was disclosed to EERE on the utilization of the subject invention and efforts made by Prime Recipient or their licensees or assignees to stimulate such utilization. The reports must include information regarding the status of development, date of first commercial sale or use, gross royalties received by the Prime Recipient, and such other data and information as EERE may specify.

xii. Intellectual Property Provisions

The standard DOE financial assistance intellectual property provisions applicable to the various types of recipients are located at <http://www1.eere.energy.gov/financing/resources.html>.

xiii. Reporting

Reporting requirements are identified on the Federal Assistance Reporting Checklist, attached to the award agreement. The checklist can be accessed at <http://www1.eere.energy.gov/financing/resources.html>.

In addition to the deliverables contained in the Federal Assistance Reporting Checklist, the following additional deliverable requirements are listed below by AOI, where applicable:

AOI 1 Special Deliverables

In addition to the deliverables required in the Federal Assistance Reporting Requirements Checklist, awards made under AOI 1 are required to provide test results from Phase 1 cells.

AOI 2 Special Deliverables:

In addition to the deliverables required in the Federal Assistance Reporting Requirements Checklist, the following deliverables are required for awards made under AOI 2:

Phase 1 Topical Report

- **Model Development and Model-level Validation** – This topical report is a comprehensive report on Phase 1 activities, and shall include experimental and computational data, comparison, and discussion. This report will contain a description of the current state of the art with respect to ICME of carbon fiber as well as how the work funded under this topic advanced the state of the art. The description shall be as quantitative as possible.

FEP Models

- The completed models shall be delivered to the DOE along with a software description document and a user's manual. The software description document shall include a high level description integrated models along with a description of input variables, output variables, state variables, and relational databases implemented within the final software deliverable. The user's manual shall provide an overall description of the user implementation approach for the software.
 - Phase 1 Data and Model Dissemination Data, models, and code: Applicants shall provide all public data and code (such as technical data used to support published journal articles or research code used for simulations) to the LightMat Consortium for curation and hosting. Proprietary and business-sensitive data are exempt from this requirement.
 - Any experimental measurements of materials properties and sample characteristics.
 - Models and related code, unless the models and code contain protected information or the implementation is made commercially available.

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Phase 2 Topical Report

- Integration and Design - this report is a comprehensive report on Phase 2 activities. It shall include:
 - A design for the FEP solution which is based on modeling results. The design must include details on the precursor material, structure, and processing of the FEP solution.
 - A table demonstrating that integrated model results are within 15% of experimental results for all relevant outputs.
 - Cost analysis, and their comparison to FOA targets.
 - Discussion and documentation of the models (documentation) and data (simulated and experimentally derived) developed in Phase 1, and its availability to the automotive materials community and the general public.
 - Requirements and performance validation.
 - Phase 2 Data and Model Dissemination Data, models, and code: Applicants shall provide all public data and code (such as technical data used to support published journal articles or research code used for simulations) to the PNNL LightMat Consortium for curation and hosting. Proprietary and business-sensitive data are exempt from this requirement. This shall include:
 - Any experimental measurements of materials properties and sample characteristics; and
 - Models and related code, unless the models and code contain sensitive information, or the implementation is made commercially available.

ix. Go/No-Go Review

Each project selected under this FOA will be subject to a periodic project evaluation referred to as a Go/No-Go Review. Federal funding beyond the Go/No Go decision point (continuation funding), is contingent on (1) the availability of funds appropriated by Congress for the purpose of this program and the availability of future-year budget authority; (2) meeting the objectives, milestones, deliverables, and decision point criteria of recipient's approved project and obtaining approval from EERE to continue work on the project; and (3) the submittal of required reports in accordance with the Statement of Project Objectives.

- a. As a result of the Go/No Go Review, DOE may, at its discretion, authorize the following actions: (1) continue to fund the project, contingent upon the availability of funds appropriated by Congress for the purpose of this program and the availability of future-year

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budget authority; (2) recommend redirection of work under the project;

- b. place a hold on federal funding for the project, pending further supporting data or funding; or
- c. discontinue funding the project because of insufficient progress, change in strategic direction, or lack of funding.

The Go/No-Go decision is distinct from a non-compliance determination. In the event a recipient fails to comply with the requirements of an award, EERE may take appropriate action, including but not limited to, redirecting, suspending or terminating the award.

x. Conference Spending

The recipient shall not expend any funds on a conference not directly and programmatically related to the purpose for which the grant or cooperative agreement was awarded that would defray the cost to the United States Government of a conference held by any Executive branch department, agency, board, commission, or office for which the cost to the United States Government would otherwise exceed \$20,000, thereby circumventing the required notification by the head of any such Executive Branch department, agency, board, commission, or office to the Inspector General (or senior ethics official for any entity without an Inspector General), of the date, location, and number of employees attending such conference.

xi. UCC Financing Statements

Per 2 CFR 910.360 (Real Property and Equipment) when a piece of equipment is purchased by a for-profit recipient or subrecipient with Federal Funds, and when the Federal share of the financial assistance agreement is more than \$1,000,000, the recipient or subrecipient must:

Properly record, and consent to the Department's ability to properly record if the recipient fails to do so, UCC financing statement(s) for all equipment in excess of \$5,000 purchased with project funds. These financing statement(s) must be approved in writing by the contracting officer prior to the recording, and they shall provide notice that the Recipient's title to all equipment (not real property) purchased with Federal funds under the financial assistance agreement is conditional pursuant to the terms of this section, and that the Government retains an undivided reversionary interest in the equipment. The UCC financing statement(s) must be filed before the Contracting Officer may reimburse the recipient for the Federal share of the equipment unless otherwise provided for in the relevant financial assistance agreement. The recipient shall further make any amendments to the financing statements or

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additional recordings, including appropriate continuation statements, as necessary or as the contracting officer may direct.

VII. Questions/Agency Contacts

Upon the issuance of a FOA, EERE personnel are prohibited from communicating (in writing or otherwise) with applicants regarding the FOA except through the established question and answer process as described below. Specifically, questions regarding the content of this FOA must be submitted to DE-FOA-0001629@netl.doe.gov. Questions must be submitted not later than five (5) business days prior to the application due date and time.

Therefore, the deadline for submission of FOA related questions will be March 19, February 26, 2017 at 8:00 PM Eastern time. Any questions submitted after that deadline will NOT be addressed. Questions regarding problems encountered with the application submittal will be answered as time permits. Applicants are encouraged to review the posted questions and answers daily. Please be as specific as possible when asking questions to insure that questions will be adequately addressed. All questions submitted must clearly identify the Area of Interest (AOI) to ensure a timely and accurate response. Failure to identify the AOI, or not being as specific as possible with a question, may result in additional time to address the question or require further correspondence for further clarification regarding the submitted questions.

All questions and answers related to this FOA will be posted on EERE Exchange at: <https://eere-exchange.energy.gov>. **Please note that you must first select this specific FOA Number in order to view the questions and answers specific to this FOA.** EERE will attempt to respond to a question within five (5) business days, unless a similar question and answer has already been posted on the website.

Questions related to the registration process and use of the EERE Exchange website should be submitted to: EERE-ExchangeSupport@hq.doe.gov.

VIII. Other Information

A. FOA Amendments

Amendments to this FOA will be posted on the EERE Exchange website and the Grants.gov system. However, you will only receive an email when an amendment or a FOA is posted on these sites if you register for email notifications for this FOA in Grants.gov. EERE recommends that you register as soon after the release of the

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FOA as possible to ensure you receive timely notice of any amendments or other FOAs.

B. Informational Webinar

EERE will conduct one informational webinar during the FOA process. It will be held after the initial FOA release but before the due date for Concept Papers.

Attendance is not mandatory and will not positively or negatively impact the overall review of any applicant submissions. As the webinar will be open to all applicants who wish to participate, applicants should refrain from asking questions or communicating information that would reveal confidential and/or proprietary information specific to their project. Specific dates for the webinar can be found on the cover page of the FOA.

C. Government Right to Reject or Negotiate

EERE reserves the right, without qualification, to reject any or all applications received in response to this FOA and to select any application, in whole or in part, as a basis for negotiation and/or award.

D. Commitment of Public Funds

The Contracting Officer is the only individual who can make awards or commit the Government to the expenditure of public funds. A commitment by anyone other than the Contracting Officer, either express or implied, is invalid.

E. Treatment of Application Information

In general, EERE will only use data and other information contained in applications for evaluation purposes, unless such information is generally available to the public or is already the property of the Government.

Applicants should not include trade secrets or commercial or financial information that is privileged or confidential in their application unless such information is necessary to convey an understanding of the proposed project or to comply with a requirement in the FOA.

The use of protective markings such as “Do Not Publicly Release – Trade Secret” or “Do Not Publicly Release – Confidential Business Information” is encouraged. However, applicants should be aware that the use of protective markings is not dispositive as to whether information will be publicly released pursuant to the Freedom of Information Act, 5 U.S.C. §552, et. seq., as amended by the OPEN Government Act of 2007, Pub. L. No. 110-175. (See Section I of this document, “Notice of Potential Disclosure under the Freedom of Information Act (FOIA)” for

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additional information regarding the public release of information under the Freedom of Information Act.

Applicants are encouraged to employ protective markings in the following manner:

- The cover sheet of the application must be marked as follows and identify the specific pages containing trade secrets or commercial or financial information that is privileged or confidential.

Notice of Restriction on Disclosure and Use of Data:

- Pages [list applicable pages] of this document may contain trade secrets or commercial or financial information that is privileged or confidential, and is exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes or in accordance with a financial assistance or loan agreement between the submitter and the Government. The Government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source. [End of Notice]
- The header and footer of every page that contains trade secrets or commercial or financial information that is privileged must be marked as follows: “May contain trade secrets or commercial or financial information that is privileged or confidential and exempt from public disclosure.”
- In addition, each line or paragraph containing trade secrets or commercial or financial information that is privileged or confidential must be enclosed in brackets.

F. Evaluation and Administration by Non-Federal Personnel

In conducting the merit review evaluation, the Go/No-Go Review and Peer Review, the Government may seek the advice of qualified non Federal personnel as reviewers. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The applicant, by submitting its application, consents to the use of non-Federal reviewers/administrators. Non-Federal reviewers must sign conflict of interest and non-disclosure agreements prior to reviewing an application. Non-Federal personnel conducting administrative activities must sign a non-disclosure agreement.

G. Notice Regarding Eligible/Ineligible Activities

Eligible activities under this FOA include those which describe and promote the understanding of scientific and technical aspects of specific energy technologies,

but not those which encourage or support political activities such as the collection and dissemination of information related to potential, planned or pending legislation.

H. Notice of Right to Conduct a Review of Financial Capability

EERE reserves the right to conduct an independent third party review of financial capability for applicants that are selected for negotiation of award (including personal credit information of principal(s) of a small business if there is insufficient information to determine financial capability of the organization).

I. Notice of Potential Disclosure Under Freedom of Information Act (FOIA)

Under the Freedom of Information Act, (FOIA), 5 U.S.C. §552, et. seq., as amended by the OPEN Government Act of 2007, Pub. L. No. 110-175, any information received from the Applicant is considered to be an agency record, and as such, subject to public release under FOIA. The purpose of the FOIA is to afford the public the right to request and receive agency records unless those agency records are protected from disclosure under one or more of the nine FOIA exemptions. Decisions to disclose or withhold information received from the Applicant are based upon the applicability of one or more of the nine FOIA exemptions, not on the existence or nonexistence of protective markings or designations. Only the agency's designated FOIA Officer may determine if information received from the Applicant may be withheld pursuant to one of the nine FOIA exemptions. All FOIA requests received by DOE are processed in accordance with 10 C.F.R. Part 1004.

J. Requirement for Full and Complete Disclosure

Applicants are required to make a full and complete disclosure of all information requested. Any failure to make a full and complete disclosure of the requested information may result in:

- The termination of award negotiations;
- The modification, suspension, and/or termination of a funding agreement;
- The initiation of debarment proceedings, debarment, and/or a declaration of ineligibility for receipt of Federal contracts, subcontracts, and financial assistance and benefits; and
- Civil and/or criminal penalties.

K. Retention of Submissions

EERE expects to retain copies of all Concept Papers, Full Applications and other submissions. No submissions will be returned. By applying to EERE for funding, applicants consent to EERE's retention of their submissions.

L. Title to Subject Inventions

Ownership of subject inventions is governed pursuant to the authorities listed below.

- Domestic Small Businesses, Educational Institutions, and Nonprofits: Under the Bayh-Dole Act (35 U.S.C. § 200 et seq.), domestic small businesses, educational institutions, and nonprofits may elect to retain title to their subject inventions.
- All other parties: The Federal Non-Nuclear Energy Act of 1974, 42 U.S.C. 5908, provides that the Government obtains title to new inventions unless a waiver is granted (see below).
- Class Patent Waiver: DOE has issued a class waiver that applies to this FOA. Under this class waiver, domestic large businesses may elect title to their subject inventions similar to the right provided to the domestic small businesses, educational institutions, and nonprofits by law. In order to avail itself of the class waiver, a domestic large business must agree that any products embodying or produced through the use of a subject invention first created or reduced to practice under this program will be substantially manufactured in the United States, unless DOE agrees that the commitments proposed in the U.S. Manufacturing Plan are sufficient.
- Advance and Identified Waivers: Applicants may request a patent waiver that will cover subject inventions that may be invented under the award, in advance of or within 30 days after the effective date of the award. Even if an advance waiver is not requested or the request is denied, the recipient will have a continuing right under the award to request a waiver for identified inventions, i.e., individual subject inventions that are disclosed to EERE within the timeframes set forth in the award's intellectual property terms and conditions. Any patent waiver that may be granted is subject to certain terms and conditions in 10 CFR 784.
- Determination of Exceptional Circumstances (DEC): Applicants applying to AOs 1, 3, and 4 are required to submit a U.S. Manufacturing Plan as part of their application. If selected, the U.S. Manufacturing Plan shall be incorporated into the award terms and conditions for domestic small businesses and nonprofit organizations. DOE has determined that exceptional circumstances exist that warrants the modification of the standard patent rights clause for small businesses and non-profit awardees

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under Bayh-Dole to the extent necessary to implement and enforce the U.S. Manufacturing Plan. For example, the commitments and enforcement of a U.S. Manufacturing Plan may be tied to subject inventions. Any Bayh-Dole entity (domestic small business or nonprofit organization) affected by this DEC has the right to appeal it.

M. Government Rights in Subject Inventions

Where Prime Recipients and Subrecipients retain title to subject inventions, the U.S. Government retains certain rights.

i. Government Use License

The U.S. Government retains a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States any subject invention throughout the world. This license extends to contractors doing work on behalf of the Government.

ii. March-In Rights

The U.S. Government retains march-in rights with respect to all subject inventions. Through “march-in rights,” the Government may require a Prime Recipient or Subrecipient who has elected to retain title to a subject invention (or their assignees or exclusive licensees), to grant a license for use of the invention to a third party. In addition, the Government may grant licenses for use of the subject invention when a Prime Recipient, Subrecipient, or their assignees and exclusive licensees refuse to do so.

DOE may exercise its march-in rights only if it determines that such action is necessary under any of the four following conditions:

- The owner or licensee has not taken or is not expected to take effective steps to achieve practical application of the invention within a reasonable time;
- The owner or licensee has not taken action to alleviate health or safety needs in a reasonably satisfied manner;
- The owner has not met public use requirements specified by Federal statutes in a reasonably satisfied manner; or
- The U.S. Manufacturing requirement has not been met.

Any determination that march-in rights are warranted must follow a fact-finding process in which the recipient has certain rights to present evidence and witnesses, confront witnesses and appear with counsel and appeal any adverse decision. To date, DOE has never exercised its march-in rights to any subject inventions.

N. Rights in Technical Data

Data rights differ based on whether data is first produced under an award or instead was developed at private expense outside the award.

“Limited Rights Data”: The U.S. Government will not normally require delivery of confidential or trade secret-type technical data developed solely at private expense prior to issuance of an award, except as necessary to monitor technical progress and evaluate the potential of proposed technologies to reach specific technical and cost metrics.

Government rights in Technical Data Produced Under Awards (Special Protected Data): The U.S. Government normally retains unlimited rights in technical data produced under Government financial assistance awards, including the right to distribute to the public. However, pursuant to special statutory authority, certain categories of data generated under EERE awards may be protected from public disclosure for up to five (5) years after the data is generated (“Protected Data”). For awards permitting Protected Data, the protected data must be marked as set forth in the awards intellectual property terms and conditions and a listing of unlimited rights data (i.e., non-protected data) must be inserted into the data clause in the award. In addition, invention disclosures may be protected from public disclosure for a reasonable time in order to allow for filing a patent application. ***EERE intends to offer five (5) years of data protection for certain categories of data generated under selected awards as outlined above under this FOA.***

O. Copyright

The Prime Recipient and Subrecipients may assert copyright in copyrightable works, such as software, first produced under the award without EERE approval. When copyright is asserted, the Government retains a paid-up nonexclusive, irrevocable worldwide license to reproduce, prepare derivative works, distribute copies to the public, and to perform publicly and display publicly the copyrighted work. This license extends to contractors and others doing work on behalf of the Government.

P. Personally Identifiable Information (PII)

All information provided by the Applicant must to the greatest extent possible exclude Personally Identifiable Information (PII). The term “personally identifiable information” refers to information which can be used to distinguish or trace an individual's identity, such as their name, social security number, biometric records, etc. alone, or when combined with other personal or identifying information which is linked or linkable to a specific individual, such as date and place of birth, mother's maiden name, etc. (See OMB Memorandum M-07-16 dated May 22, 2007, found

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at:

<https://www.whitehouse.gov/sites/default/files/omb/memoranda/fy2007/m07-16.pdf>

By way of example, Applicants must screen resumes to ensure that they do not contain PII such as personal addresses, phone/cell numbers, personal emails and/or SSNs. In short, if the PII is not essential to the application, it should not be in the application.

Q. Annual Compliance Audits

If a for-profit entity is a Prime Recipient and has expended \$750,000 or more of DOE funds during the entity's fiscal year, an annual compliance audit performed by an independent auditor is required. For additional information, please refer to 2 C.F.R. § 910.501 and Subpart F.

If an educational institution, non-profit organization, or state/local government is a Prime Recipient or Subrecipient and has expended \$750,000 or more of Federal funds during the non-Federal entity's fiscal year, then a single or program-specific audit is required. For additional information, please refer to 2 C.F.R. § 200.501 and Subpart F.

Applicants and sub-recipients (if applicable) should propose sufficient costs in the project budget to cover the costs associated with the audit. EERE will share in the cost of the audit at its applicable cost share ratio.

Appendix A – Cost Share Information

Cost Sharing or Cost Matching

The terms “cost sharing” and “cost matching” are often used synonymously. Even the DOE Financial Assistance Regulations, 2 CFR 200.306, use both of the terms in the titles specific to regulations applicable to cost sharing. EERE almost always uses the term “cost sharing,” as it conveys the concept that non-federal share is calculated as a percentage of the Total Project Cost. An exception is the State Energy Program Regulation, 10 CFR 420.12, State Matching Contribution. Here “cost matching” for the non-federal share is calculated as a percentage of the Federal funds only, rather than the Total Project Cost.

How Cost Sharing Is Calculated

As stated above, cost sharing is calculated as a percentage of the Total Project Cost. FFRDC costs must be included in Total Project Costs. Following is an example of how to calculate cost sharing amounts for a project with \$1,000,000 in federal funds with a minimum 20% non-federal cost sharing requirement:

- Formula: Federal share (\$) divided by Federal share (%) = Total Project Cost
Example: \$1,000,000 divided by 80% = \$1,250,000
- Formula: Total Project Cost (\$) minus Federal share (\$) = Non-federal share (\$)
Example: \$1,250,000 minus \$1,000,000 = \$250,000
- Formula: Non-federal share (\$) divided by Total Project Cost (\$) = Non-federal share (%)
Example: \$250,000 divided by \$1,250,000 = 20%

What Qualifies For Cost Sharing

While it is not possible to explain what specifically qualifies for cost sharing in one or even a couple of sentences, in general, if a cost is allowable under the cost principles applicable to the organization incurring the cost and is eligible for reimbursement under an EERE grant or cooperative agreement, then it is allowable as cost share. Conversely, if the cost is not allowable under the cost principles and not eligible for reimbursement, then it is not allowable as cost share. In addition, costs may not be counted as cost share if they are paid by the Federal Government under another award unless authorized by Federal statute to be used for cost sharing.

The rules associated with what is allowable as cost share are specific to the type of organization that is receiving funds under the grant or cooperative agreement, though are generally the same for all types of entities. The specific rules applicable to:

- FAR Part 31 for For-Profit entities, (48 CFR Part 31); and

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- 2 CFR Part 200 Subpart E - Cost Principles for all other non-federal entities.

In addition to the regulations referenced above, other factors may also come into play such as timing of donations and length of the project period. For example, the value of ten years of donated maintenance on a project that has a project period of five years would not be fully allowable as cost share. Only the value for the five years of donated maintenance that corresponds to the project period is allowable and may be counted as cost share.

Additionally, EERE generally does not allow pre-award costs for either cost share or reimbursement when these costs precede the signing of the appropriation bill that funds the award. In the case of a competitive award, EERE generally does not allow pre-award costs prior to the signing of the Selection Statement by the EERE Selection Official.

DOE Financial Assistance Rules 2 CFR Part 200 as amended by 2 CFR Part 910

As stated above, the rules associated with what is allowable cost share are generally the same for all types of organizations. Following are the rules found to be common, but again, the specifics are contained in the regulations and cost principles specific to the type of entity:

(A) Acceptable contributions. All contributions, including cash contributions and third party in-kind contributions, must be accepted as part of the Prime Recipient's cost sharing if such contributions meet all of the following criteria:

1. They are verifiable from the recipient's records.
2. They are not included as contributions for any other federally-assisted project or program.
3. They are necessary and reasonable for the proper and efficient accomplishment of project or program objectives.
4. They are allowable under the cost principles applicable to the type of entity incurring the cost as follows:
 - a. For-profit organizations. Allowability of costs incurred by for-profit organizations and those nonprofit organizations listed in Attachment C to OMB Circular A-122 is determined in accordance with the for-profit cost principles in 48 CFR Part 31 in the Federal Acquisition Regulation, except that patent prosecution costs are not allowable unless specifically authorized in the award document. (v) Commercial Organizations. FAR Subpart 31.2—Contracts with Commercial Organizations
 - b. Other types of organizations. For all other non-federal entities, allowability of costs is determined in accordance with 2 CFR Part 200 Subpart E.

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- I. They are not paid by the Federal Government under another award unless authorized by Federal statute to be used for cost sharing or matching.
- II. They are provided for in the approved budget.

(B) Valuing and documenting contributions

1. Valuing recipient's property or services of recipient's employees. Values are established in accordance with the applicable cost principles, which mean that amounts chargeable to the project are determined on the basis of costs incurred. For real property or equipment used on the project, the cost principles authorize depreciation or use charges. The full value of the item may be applied when the item will be consumed in the performance of the award or fully depreciated by the end of the award. In cases where the full value of a donated capital asset is to be applied as cost sharing or matching, that full value must be the lesser of the following:

- a. The certified value of the remaining life of the property recorded in the recipient's accounting records at the time of donation; or
 - b. The current fair market value. If there is sufficient justification, the Contracting Officer may approve the use of the current fair market value of the donated property, even if it exceeds the certified value at the time of donation to the project. The Contracting Officer may accept the use of any reasonable basis for determining the fair market value of the property.
- I. Valuing services of others' employees. If an employer other than the recipient furnishes the services of an employee, those services are valued at the employee's regular rate of pay, provided these services are for the same skill level for which the employee is normally paid.
 - II. Valuing volunteer services. Volunteer services furnished by professional and technical personnel, consultants, and other skilled and unskilled labor may be counted as cost sharing or matching if the service is an integral and necessary part of an approved project or program. Rates for volunteer services must be consistent with those paid for similar work in the recipient's organization. In those markets in which the required skills are not found in the recipient organization, rates must be consistent with those paid for similar work in the labor market in which the recipient competes for the kind of services involved. In either case, paid fringe benefits that are reasonable, allowable, and allocable may be included in the valuation.

2. Valuing property donated by third parties.

- a. Donated supplies may include such items as office supplies or laboratory supplies. Value assessed to donated supplies included in the cost sharing or matching share must be reasonable and must not exceed the fair market value of the property at the time of the donation.
- b. Normally only depreciation or use charges for equipment and buildings may be applied. However, the fair rental charges for land and the full value of equipment or other capital assets may be allowed, when they will be consumed in the performance of the award or fully depreciated by the end of the award, provided that the Contracting Officer has approved the charges. When use charges are applied, values must be determined in accordance with the usual accounting policies of the recipient, with the following qualifications:
 - i. The value of donated space must not exceed the fair rental value of comparable space as established by an independent appraisal of comparable space and facilities in a privately-owned building in the same locality.
 - ii. The value of loaned equipment must not exceed its fair rental value.

3. Documentation. The following requirements pertain to the recipient's supporting records for in-kind contributions from third parties:

- a. Volunteer services must be documented and, to the extent feasible, supported by the same methods used by the recipient for its own employees.
- b. The basis for determining the valuation for personal services and property must be documented.

Appendix B – Sample Cost Share Calculation for Blended Cost Share Percentage

The following example shows the math for calculating required cost share for a project with \$2,000,000 in Federal funds with four tasks requiring different Non-federal cost share percentages:

Task	Proposed Federal Share	Federal Share %	Recipient Share %
Task 1 (R&D)	\$1,000,000	80%	20%
Task 2 (R&D)	\$500,000	80%	20%
Task 3 (Demonstration)	\$400,000	50%	50%
Task 4 (Outreach)	\$100,000	100%	0%

Federal share (\$) divided by Federal share (%) = Task Cost

Each task must be calculated individually as follows:

Task 1

\$1,000,000 divided by 80% = \$1,250,000 (Task 1 Cost)

Task 1 Cost minus federal share = Non-federal share

\$1,250,000 - \$1,000,000 = \$250,000 (Non-federal share)

Task 2

\$500,000 divided 80% = \$625,000 (Task 2 Cost)

Task 2 Cost minus federal share = Non-federal share

\$625,000 - \$500,000 = \$125,000 (Non-federal share)

Task 3

\$400,000 / 50% = \$800,000 (Task 3 Cost)

Task 3 Cost minus federal share = Non-federal share

\$800,000 - \$400,000 = \$400,000 (Non-federal share)

Task 4

Federal share = \$100,000

Non-federal cost share is not mandated for outreach = \$0 (Non-federal share)

The calculation may then be completed as follows:

Tasks	\$ Federal Share	% Federal Share	\$ Non-Federal Share	% Non-Federal Share	Total Project Cost
Task 1	\$1,000,000	80%	\$250,000	20%	\$1,250,000
Task 2	\$500,000	80%	\$125,000	20%	\$625,000
Task 3	\$400,000	50%	\$400,000	50%	\$800,000
Task 4	\$100,000	100%	\$0	0%	\$100,000
Totals	\$2,000,000		\$775,000		\$2,775,000

Blended Cost Share %

Non-federal share (\$775,000) divided by Total Project Cost (\$2,775,000) = 27.9% (Non-federal)

Federal share (\$2,000,000) divided by Total Project Cost (\$2,775,000) = 72.1% (Federal)

Appendix C – Waiver Requests: Performance of Work in the United States

Waiver for Performance of Work in the United States

As set forth in Section IV.D.xii, all work under EERE funding agreements must be performed in the United States. This requirement does not apply to the purchase of supplies and equipment, so a waiver is not required for foreign purchases of these items. However, the Prime Recipient should make every effort to purchase supplies and equipment within the United States. There may be limited circumstances where it is in the interest of the project to perform a portion of the work outside the United States. To seek a waiver of the Performance of Work in the United States requirement, the applicant must submit an explicit waiver request in the Full Application. A separate waiver request must be submitted for each entity proposing performance of work outside of the United States.

Overall, a waiver request must demonstrate to the satisfaction of EERE that it would further the purposes of this FOA and is otherwise in the economic interests of the United States to perform work outside of the United States. A request to waive the *Performance of Work in the United States* requirement must include the following:

- The rationale for performing the work outside the U.S. (“foreign work”);
- A description of the work proposed to be performed outside the U.S.;
- An explanation as to how the foreign work is essential to the project;
- A description of the anticipated benefits to be realized by the proposed foreign work and the anticipated contributions to the US economy;
 - The associated benefits to be realized and the contribution to the project from the foreign work;
 - How the foreign work will benefit U.S. research, development and manufacturing, including contributions to employment in the U.S. and growth in new markets and jobs in the U.S.;
 - How the foreign work will promote domestic American manufacturing of products and/or services;
- A description of the likelihood of Intellectual Property (IP) being created from the foreign work and the treatment of any such IP;
- The total estimated cost (DOE and Recipient cost share) of the proposed foreign work;
- The countries in which the foreign work is proposed to be performed; and
- The name of the entity that would perform the foreign work.

EERE may require additional information before considering the waiver request.

The applicant does not have the right to appeal EERE’s decision concerning a waiver request.

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Appendix D - Data Management Plan

A data management plan (“DMP”) explains how data generated in the course of the work performed under an EERE award will be shared and preserved or, when justified, explains why data sharing or preservation is not possible or scientifically appropriate.

DMP Requirements

In order for a DMP to be considered acceptable, the DMP must address the following:

At a minimum, the DMP must describe how data sharing and preservation will enable validation of the results from the proposed work, or how results could be validated if data are not shared or preserved.

The DMP must provide a plan for making all research data displayed in publications resulting from the proposed work digitally accessible at the time of publication. This includes data that are displayed in charts, figures, images, etc. In addition, the underlying digital research data used to generate the displayed data should be made as accessible as possible in accordance with the principles stated above. This requirement could be met by including the data as supplementary information to the published article, or through other means. The published article should indicate how these data can be accessed.

The DMP should consult and reference available information about data management resources to be used in the course of the proposed work. In particular, a DMP that explicitly or implicitly commits data management resources at a facility beyond what is conventionally made available to approved users should be accompanied by written approval from that facility. In determining the resources available for data management at DOE User Facilities, researchers should consult the published description of data management resources and practices at that facility and reference it in the DMP. Information about other DOE facilities can be found in the additional guidance from the sponsoring program.

The DMP must protect confidentiality, personal privacy, Personally Identifiable Information, and U.S. national, homeland, and economic security; recognize proprietary interests, business confidential information, and intellectual property rights; avoid significant negative impact on innovation, and U.S. competitiveness; and otherwise be consistent with all laws (i.e., export control laws), and DOE regulations, orders, and policies.

Data Determination for a DMP

The Principal Investigator should determine which data should be the subject of the DMP and, in the DMP, propose which data should be shared and/or preserved in accordance with the DMP Requirements noted above.

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For data that will be generated through the course of the proposed work, the Principal Investigator should indicate what types of data should be protected from immediate public disclosure by DOE (referred to as “protected data”) and what types of data that DOE should be able to release immediately. Similarly, for data developed outside of the proposed work at private expense that will be used in the course of the proposed work, the Principal Investigator should indicate whether that type of data will be subject to public release or kept confidential (referred to as “limited rights data”). Any use of limited rights data or labeling of data as “protected data” must be consistent with the DMP Requirements noted above.

Suggested Elements for a DMP

The following list of elements for a DMP provides suggestions regarding the data management planning process and the structure of the DMP:

Data Types and Sources: A brief, high-level description of the data to be generated or used through the course of the proposed work and which of these are considered digital research data necessary to validate the research findings or results.

Content and Format: A statement of plans for data and metadata content and format including, where applicable, a description of documentation plans, annotation of relevant software, and the rationale for the selection of appropriate standards. Existing, accepted community standards should be used where possible. Where community standards are missing or inadequate, the DMP could propose alternate strategies for facilitating sharing, and should advise the sponsoring program of any need to develop or generalize standards.

Sharing and Preservation: A description of the plans for data sharing and preservation. This should include, when appropriate: the anticipated means for sharing and the rationale for any restrictions on who may access the data and under what conditions; a timeline for sharing and preservation that addresses both the minimum length of time the data will be available and any anticipated delay to data access after research findings are published; any special requirements for data sharing, for example, proprietary software needed to access or interpret data, applicable policies, provisions, and licenses for re-use and re-distribution, and for the production of derivatives, including guidance for how data and data products should be cited; any resources and capabilities (equipment, connections, systems, software, expertise, etc.) requested in the research proposal that are needed to meet the stated goals for sharing and preservation (this could reference the relevant section of the associated research proposal and budget request); and whether/where the data will be preserved after direct project funding ends and any plans for the transfer of responsibilities for sharing and preservation.

Protection: A statement of plans, where appropriate and necessary, to protect confidentiality, personal privacy, Personally Identifiable Information, and U.S. national, homeland, and economic security; recognize proprietary interests, business confidential information, and intellectual property rights; and avoid significant negative impact on innovation, and U.S. competitiveness.

Rationale: A discussion of the rationale or justification for the proposed data management plan including, for example, the potential impact of the data within the immediate field and in other fields, and any broader societal impact.

Additional Guidance

In determining which data should be shared and preserved, researchers must consider the data needed to validate research findings as described in the Requirements, and are encouraged to consider the potential benefits of their data to their own fields of research, fields other than their own, and society at large.

DMPs should reflect relevant standards and community best practices and make use of community accepted repositories whenever practicable.

Costs associated with the scope of work and resources articulated in a DMP may be included in the proposed research budget as permitted by the applicable cost principles.

To improve the discoverability of and attribution for datasets created and used in the course of research, EERE encourages the citation of publicly available datasets within the reference section of publications, and the identification of datasets with persistent identifiers such as Digital Object Identifiers (DOIs). In most cases, EERE can provide DOIs free of charge for data resulting from DOE-funded research through its Office of Scientific and Technical Information (OSTI) Data ID Service.

EERE's Digital Data Management principles can be found at: [EERE Digital Data Management | Department of Energy](#)

Definitions

Data Preservation: Data preservation means providing for the usability of data beyond the lifetime of the research activity that generated them.

Data Sharing: Data sharing means making data available to people other than those who have generated them. Examples of data sharing range from bilateral communications with colleagues, to providing free, unrestricted access to anyone through, for example, a web-based platform.

Digital Research Data: The term digital data encompasses a wide variety of information stored in digital form including: experimental, observational, and simulation data; codes, software and algorithms; text; numeric information; images; video; audio; and associated metadata. It also encompasses information in a variety of different forms including raw, processed, and analyzed data, published and archived data.

Research Data: The recorded factual material commonly accepted in the scientific community as necessary to validate research findings, but not any of the following: preliminary analyses, drafts of scientific papers, plans for future research, peer reviews, or communications with colleagues. This 'recorded' material excludes physical objects (e.g., laboratory samples). Research data also do not include:

- (A) Trade secrets, commercial information, materials necessary to be held confidential by a researcher until they are published, or similar information which is protected under law; and
- (B) Personnel and medical information and similar information the disclosure of which would constitute a clearly unwarranted invasion of personal privacy, such as information that could be used to identify a particular person in a research study."

Validate: In the context of DMPs, validate means to support, corroborate, verify, or otherwise determine the legitimacy of the research findings. Validation of research findings could be accomplished by reproducing the original experiment or analyses; comparing and contrasting the results against those of a new experiment or analyses; or by some other means.